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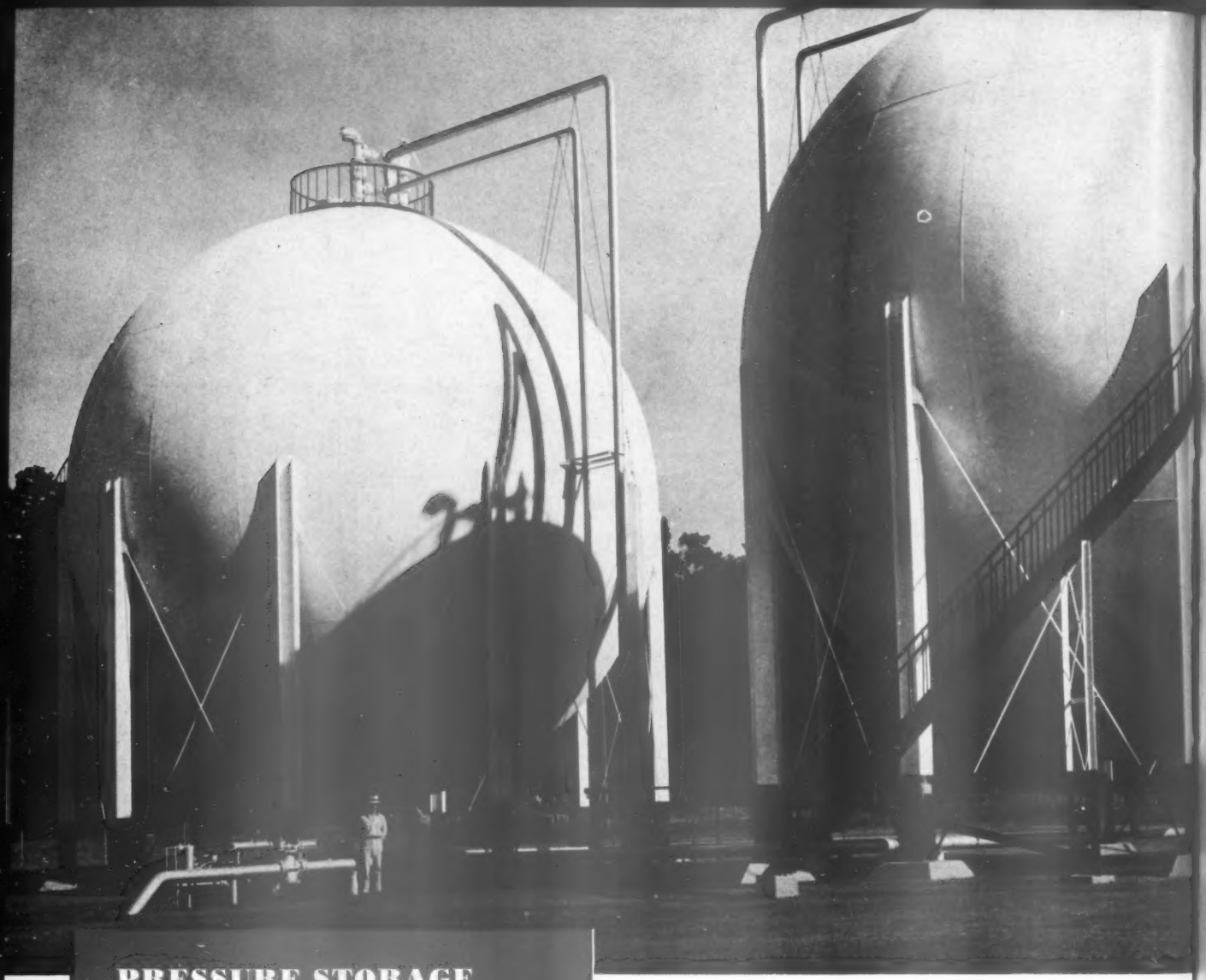

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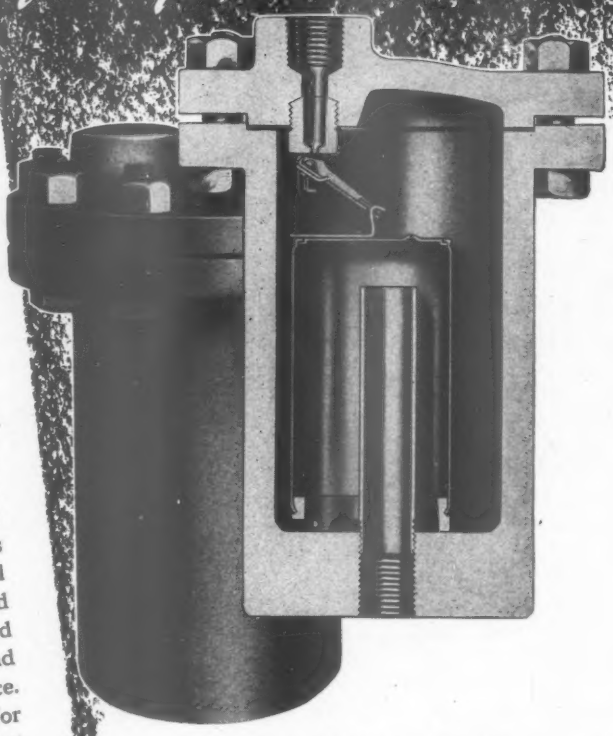

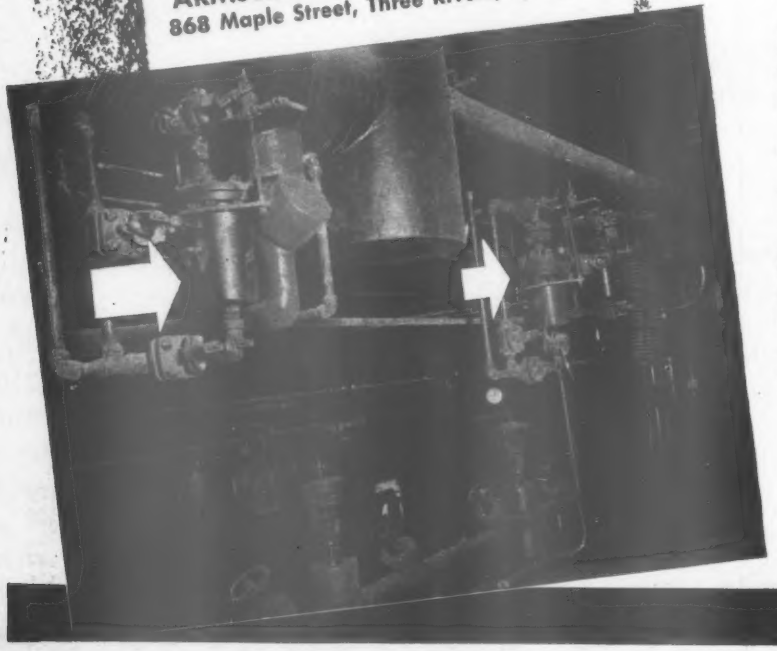

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Trends

Crude-Oil Production By States — Page 84

CRUDE PRODUCTION 3,946,595 bbl. daily average—down 35,420 bbl. One year ago 3,623,530 bbl.

CRUDE STOCKS 245,752,000 bbl. as of May 29—up 2,092,000 bbl. One year ago 255,023,000 bbl.

GASOLINE STOCKS 83,937,000 bbl. as of May 29—down 1,229,000 bbl. One year ago 95,283,000 bbl.

RESIDUAL FUEL-OIL STOCKS 67,682,000 bbl. as of May 29—down 35,000. One year ago 79,690,000 bbl.

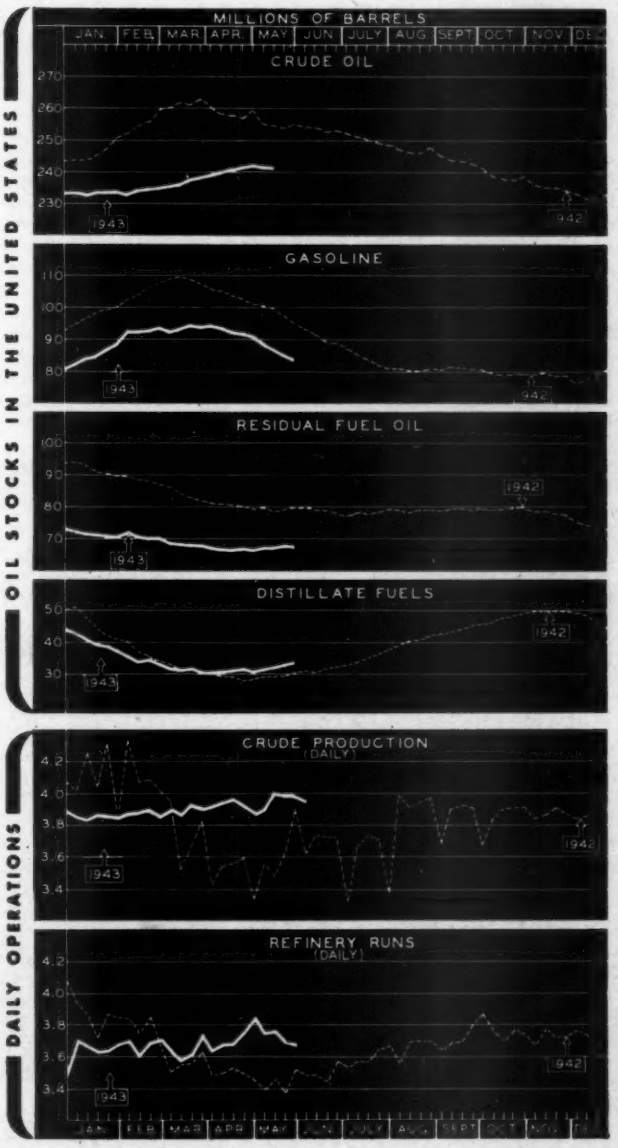
GAS OIL AND DISTILLATES 32,274,000 bbl. as of May 29—up 81,000. One year ago 30,391,000 bbl.

REFINERY RUNS 3,679,000 bbl. daily week ended May 29—down 19,000. One year ago 3,521,000 bbl.

OFFICIAL indications that consumers in the Middle West are to be more severely rationed in the use of gasoline as the summer season gets under way was a development at the start of the week. The statement coming Monday from a PAW transportation official places the responsibility for this proposed change on transportation conditions and the pressure to make more gasoline available in the East and Southeast by reducing consumption in the areas to the west of those sections. Regardless of the immediate reason the statisticians of the industry have been aware that this development has been in the making for several months based not so much on transportation as on available supplies.

A STUDY of the current stock, supply and demand conditions now and a year ago will reveal the situation which confronts civilian and military consumers of gasoline. Inventories of gasoline for the week ended May 29, as reported by the A.P.I., totaled 83,937,000 bbl., a reduction of 10 per cent compared to the corresponding date in 1942. With the exception of California where stocks of gasoline are 23 per cent higher, inventories are generally lower. The decreases are: Censored area (Texas, Louisiana, Arkansas, East Coast), 24 per cent; Appalachian, 30 per cent; Indiana, Illinois, Kentucky, 2.2 per cent; Oklahoma, Kansas, Missouri, 28 per cent; Rocky Mountains, 24 per cent.

IT has been contended by some in recent weeks that the reduced stocks of gasoline were not cause for alarm because under national rationing, actual consumption by civilians would be much less. The fact is that the consumption by civilians has been larger than was expected particularly during May when the preliminary information of the Government reveals that demands (civilian and military) were close to the May 1942 totals. This has been explained as due both to the weaknesses in the civilian rationing program and the fact that military demands have been greater than was expected. The Government itself has stressed the increased agricultural needs. These figures, economists are pointing out, should be studied alongside the data covering runs to stills. In the interior area extending from the Appalachian to the Rocky Mountains, including Oklahoma and Kansas, runs to stills are actually about 125,000 bbl. daily or 9 per cent less than they were a year ago. This reflects a declining crude supply in that section.



War Department Organizing New Division for Handling Most Oil-Procurement Duty

WASHINGTON, D. C.—The War Department is completely reorganizing its administrative machinery for handling petroleum matters within the Army Service Forces through a new Fuel and Lubricants Division of the Quartermaster General's Office.

The new division is headed by Col. W. E. R. Covell, who was an honor graduate of West Point in 1915 and of Massachusetts Institute of Technology and had more than 20 years' service in the Engineer Corps. In recent years he has been retired and has been general manager of the Crossett-Arkansas Co., manufacturers of paper, lumber and chemicals in El Dorado, Ark. He has now been recalled to active duty and is slated to be made a brigadier general shortly. He is understood to be recruiting a staff of former oil-company executives, probably from among such now in the Army. The new division has been in existence only a few days and has no staff as yet except that of the old Fuels Branch of the Quartermaster Procurement Division, which had limited scope.

Duties of New Division

The new division is charged with procurement, storage, and distribution of all petroleum products, fuel and lubricants and their containers used by any branch of the Army except lubricants for special weapons and fuel and lubricants used by Army aircraft. Thus, except for aviation gasoline and a few specialty lubricants, it will handle and coordinate all oil matters for the Army and will also cooperate with the Navy through the existing joint Army-Navy Petroleum Board.

It is understood the new division was created at the instance of Gen. Brehon B. Somervell chief of the Army Service Forces to provide better long-range planning and coordination among the various Army units in obtaining oil supplies. Heretofore many units have made sudden demands for motor gasoline and fuel oil which at times caused serious inroads in supplies planned for civilian use and has caused local oil shortages and upset industry supply and transportation programs. Better coordination of Army oil procurement is expected to provide the Petroleum Administration for War and the industry with information upon which to base plans for meeting those military demands which could reasonably be anticipated.

It was also rumored here that the Army is building an organization prepared to rehabilitate oil fields, refineries and transportation equipment in occupied areas recaptured from the enemy and to assist in increasing oil production in Allied territory which might serve troops in the field. Officials of the Quartermaster Corps, however, stated that this is and would remain a function of the Engineer Corps and would not be a part of the new division headed by Colonel Covell

Creation of the new oil-procurement organization apparently is the War Department's answer to criticism from the industry. The PIWC and PAW have long contended that conditions under which the Army could make unexpected calls for petroleum made it impossible to keep supplies in balance with demand.

District 3 Refinery Quotas Raised

WASHINGTON, D. C. — Crude oil quotas to refineries in District 3 have been increased more than 63,000 bbl. daily during June by telegraphic instructions sent by the Petroleum Administration for War.

The entire increase is confined to 14 Gulf Coast refineries, which are permitted to run during June, 85 per cent of the crude they ran during the "normal" period of the last 6 months of 1941. During May they had been operating at 75.2 per cent of normal.

No changes were made in the refinery runs of plants already producing maximum quantities of petroleum war products, nor those already operating in excess of 85 per cent of normal. The increases were made because stocks at Gulf Coast refineries have been declining rapidly in recent weeks and the industry committee recommended that it would be unsafe to permit inventories to fall below 58 per cent of capacity.

Individual refinery quotas which were raised above the May levels are as follows:

DISTRICT 3 REFINING QUOTAS

Company and plant location—	June quota	May quota
Amsco Refining Co., Corpus Christi	8,108	8,108
Atlantic Refining Co., Atreco	21,792	19,337
Coastal Refineries, Inc.	6,360	6,360
Continental Oil Co., Lake Charles	12,383	12,383
Crown Central Petroleum Co., Houston	11,388	10,075
Gulf Oil Corp., Port Arthur	127,417	120,809
Humble Oil & Refining Co., Baytown and Ingleside	189,501	182,995
Magnolia Petroleum Co., Beaumont	91,493	86,000
Maritime Oil Co., Houston	5,630	5,630
Pan American Refining Co., Texas City	88,200	88,200
Pan American Refining Co., Destrahan	8,500	8,500
Pontiac Refining Corp., Corpus Christi	20,798	20,798
Pure Oil Co., Nederland	40,490	35,822
Republic Oil Refining Co., Texas City	18,100	15,900
Shell Oil Co., Inc., Houston and Norco	93,857	93,857
Sinclair Refining Co., Houston	62,406	55,442
Southwestern Oil & Refining Co., Corpus Christi	9,834	9,700
Standard Oil Co. of Louisiana, Baton Rouge	123,944	119,916
Taylor Refining Co., Corpus Christi	17,503	15,991
Texas Co., Galena Park, Port Arthur and Port Neches	153,843	135,592
Chalmette Petroleum Corp., Chalmette	6,878	6,878
Eastern States Petroleum Co., Houston	7,885	6,976
Sinclair Refining Co., Corpus Christi	7,602	6,725
Southport Petroleum Co., Texas City	13,370	11,829
Total quota	1,147,282	1,083,823

Procedure Is Changed for Export of Oil Equipment

WASHINGTON, D. C.—New procedure for the export of petroleum equipment is established in amended Priorities Regulation 9 issued June 7 by the War Production Board.

The new regulation establishes the general over-all procedure by which the foreign petroleum industry obtains material for essential oil operations. It validates form WPB-743 (formerly known as PD-311) which is the basic operating document used by operators in applying for material. Under the new regulation a complete integration with the Controlled Materials Plan is secured. An important feature of the new regulation is that WPB-743 becomes the only method of securing priorities assistance for materials for foreign operations.

Form WPB-743 has been revised in several minor respects. The definitions of the form now coincide in almost every instance with the definitions of P-98-b. In addition, the new form has eliminated two columns which were considered unnecessary. The most important alterations in the form are as follows:

1. Material may now be secured on the form for any construction operation having a material cost when completed of $5,000 or less. This means that in natural-gasoline production, refining, transportation and marketing material may now be secured for small construction projects on Form WPB-743 without the necessity of filing PD-200's. The form also includes, of course, all material necessary for construction operations in the production branch of the industry and all MRO material.

2. In submitting material requirements on the form the operator will now break his requirements into two parts (a) MRO, (b) Construction. This will enable the Petroleum Administration for War to screen more effectively the individual requirements of particular operators and to identify material requirements with particular operations. Under the Controlled Materials Plan this type of identification of material use is absolutely necessary if full requirements for important petroleum operations are to be obtained.

Congressional Fight Launched to Put PAW In Charge of Prices

WASHINGTON, D. C. — The possibility that the Office of Price Administration may be broken up by congressional action and control of oil prices and oil rationing assigned to the Petroleum Administration for War loomed large early this week.

Rep. Wesley Disney of Oklahoma introduced a bill June 7 to transfer to PAW all oil-price functions of OPA and to require that the oil-price index be not lower than the all-commodity index of the Department of Labor. Mr. Disney said the general index is now 104 while the average oil-price index is only 61.2, and he estimated this would require an increase of about 70 cents per barrel in crude prices.

Simultaneously, Rep. Fred A. Hartley of New Jersey introduced a bill to abolish OPA and transfer its activities to various other federal agencies, including transfer of oil prices and oil rationing to PAW.

Neither of these bills is expected to pass as a separate measure but they may be offered as amendments to the OPA appropriation bill which must be considered soon.

Texans Honor Little and Frasher

SAN ANTONIO, Tex. — Oil men's meetings sponsored annually for the past 6 years by the South Texas Chamber of Commerce will hereafter be statewide instead of regional in scope, it was decided at the sixth annual South Texas oil meeting.

Declaring that the oil industry has advanced Texas 50 years economically, D. A. Little, president of Magnolia Petroleum Co., Dallas, told the meeting here June 2 that oil has brought to the state probably more money than either cattle or cotton, backbone of the other two leading industries of the past.

Mr. Little was one of two outstanding oil men specially honored at the meeting. The other honoree was F. M. Frasher, head of Duval Petroleum Co., San Antonio.

O. W. Killam, Laredo, veteran independent oil man, warned that failure to grant crude-oil price increases, and bureaucratic regulation of the industry, had precipitated a crises.

With Al Buchanan, San Antonio oil man and newly-elected president of the South Texas chamber, as toastmaster, nearly 400 persons cheered the speeches and entertainment provided by the regional chamber.

F. M. Frasher and D. A. Little holding the plaques presented by Col. Ray Leeman, executive vice presidents of the South Texas Chamber of Commrce, when the two Texas oil men were honored last week

Negotiations for Export of Equipment To Mexico Still Far From Conclusion

WASHINGTON, D. C.—Negotiations between the governments of Mexico and the United States for the export of large quantities of oil producing and refining equipment are still far from conclusion, according to information available here.

More than a year ago, Mexico asked for materials to rehabilitate her oil fields and to increase production and the Petroleum Administration for War sent a party of experts headed by Assistant Deputy Administrator E. L. DeGolyer to Mexico last August to investigate equipment needs of the oil industry there. Since then the problem has been one of trying to locate material which can be spared from pressing domestic war-industry needs. With the United States oil industry allocated considerably less equipment than it needs, it apparently has been impossible to locate significant quantities for export.

Among other things, Mexico seeks equipment to construct a 100-octane refinery which calls for equipment urgently demanded for the United States aviation-gasoline, synthetic-rubber and escort-vessel programs.

Commission Studying Economics

A joint commission of economic experts is now in session studying adjustment of Mexico's war economy, and while its authority appears broad enough to include recommendations regarding the Mexican oil industry, it was stated at the State Department that this group is chiefly concerned with the present heavy flow of United States capital to Mexico and with increasing the export of certain consumer goods to Mexico, and that oil equipment probably would not be discussed.

This commission was formed following the border visit of Presidents Roosevelt and Avila Camacho. Mexican members are Evaristo Araiza, general manager of the Monterrey Steel Works, and Valentin R. Garfias, mining engineer, with Dr. Jesus Silva Herzog of the Ministry of Finance, secretary. United States representatives are Wayne Chatfield Taylor, undersecretary of commerce, and Dr. Harry White, assistant to the secretary of the Treasury, with Dr. Agustus Maffry of the Commerce Department, secretary.

It is understood that PAW, at the request of government officials, has been making investigations relative to the desirability of aiding in bringing about a partial rehabilitation of oil operations in Mexico at this time as a contribution to the war program. Very little new work has been done in field, pipe line, and refinery operations since the government's expropriation of most of the private oil properties in 1938 and practically every type of equipment and material will be required to expand or maintain present operations. It is stated that a further contraction in the refining of products is assured later in the year unless there is substantial repair work at the several plants operated by Petroleos Mexicanos, the government's oil-operating unit.

It has been indicated that PAW might make a favorable recommendation on a 100-octane plant at Mexico City or some other point nearer the Poza Rica field which accounts for most of Mexico's crude-oil production at this time. The refinery at Mexico City is a topping and blending plant with a rated crude-oil capacity of 20,000 bbl. daily. The other two large plants are located at Ciudad Madero with a capacity of 63,000 bbl. daily and Minatitlan, 30,000 bbl. daily. The Poza Rica field has a 7,500-bbl. topping plant.

Sponsors of the 100-octane plant for Mexico have pointed out that no high-octane motor fuel is produced there at this time, necessitating the importation of the fuel required in the war program, from the United States. Other petroleum products, not readily available in Mexico, are also being imported with long rail hauls required in making deliveries to points of consumption.

The question of supplying critical petroleum equipment to Mexico will be decided, war agencies here concede, on the basis of where a fixed tonnage of steel will best promote the war program.

Cooperative Answer on Crude Prices Proposed by PIWC Group

WASHINGTON, D. C.—A cooperative answer from the entire oil industry to the action of the Office of Price Administration in rejecting the application for an increase in the price of crude oil was proposed to the Petroleum Industry War Council by its committee on cost and price adjustment last week.

The report, submitted by Chairman John D. Gill, analyzed in detail many paragraphs from the letter of Price Administrator Brown to Petroleum Administrator Ickes in denying the request for a crude increase of 35 cents per barrel and suggesting as alternatives a program of government loans for drilling and specific relief for certain high-cost projects. The committee proposed that various executives in the oil industry prepare answers to specific statements of Mr. Brown and that the committee then use this material in drafting a composite answer and a new application for a price increase.

The council's committee on production reported that materials may be insufficient to drill the requested 4,300 new wells during the third quarter of this year. It estimated that 266,000 tons of carbon steel would be required for this drilling, whereas the requirements committee of the War Production Board has allotted only 155,000 tons for oil-well drilling during the third quarter. A request is pending for an additional allocation of 45,000 tons, but the committee stated that the number of wells drilled probably will depend on how much material can be obtained from inventories and by reclamation.

The next meeting of the PIWC will be held on July 14, and probably only one additional meeting will be held during the summer. Hereafter the council will convene on Wednesdays, instead of on Tuesdays as in the past.

Among the resolutions adopted was one calling on the secretary of the Interior to decrease the royalties on certain oil leaseholds on the public domain.

THIS WEEK

REFINING— Crude-oil quotas for District 3 refiners raised more than 60,000 bbl. daily, to arrest dwindling stocks, increase war-fuel production. . . . ¶Rubber Director Jeffers promises completion of all government rubber plants by next November. . . . ¶New scheduling procedure, by WPB, aims at making materials available at new refinery units, when needed. . . . ¶S.A.E. hears prediction that diesel fuels will be on critical list by 1944. . . . Aviation-fuel manufacture cuts deeply into distillate-fuel production. . . . ¶Negotiations for 100-octane plant in Mexico still under way. . . . Project far from authorization stage. . . .

TRANSPORTATION— Flood interruptions being overcome. . . . Tank-car shipments to East Coast rise 6,129 bbl., to daily average of 890,897; still 90,000 bbl. daily under preflood rate. . . . Limited number of tank cars circumscribe deliverability of crude from Norris City, Ill., terminal of 24-in. . . . ¶WPB authorizes construction of Stanolind Pipe Line Co.'s 16-in. project from West Texas to Drumright, Okla., connection with Mid-Continent trunk system, earmarks necessary steel. . . . ¶Fifteen seagoing tankers launched in May, contributing to another new record for American shipyards. . . .

PRIORITIES—Little change noted so far in availability of materials. . . . Construction engineers anticipate gradual improvement in meshing production with building schedules. . . . ¶Designation of emergency field-supply depots awaited by operators. . . .

PRICES— Cooperative answer from industry to OPA, on crude-oil prices, proposed by PIWC subcommittee. . . . Each company would make separate analysis, contributing to a composite reply. . . . ¶Specific dollars-and-cents ceilings issued for group of products sold at Gulf Coast refineries and terminals, for delivery to District 1. . . . ¶Upward adjustment authorized, by OPA, on Aliso Canyon field (California) crude. . . . ¶Price control removed from catalysts sold for aviation-gasoline production. . . .

SUPPLIES—PAW executive admits plan under consideration to tighten restrictions on Middle West consumption. . . . Details uncertain. . . . ¶Army reorganizing petroleum-procurement procedure. . . . Coordination sought to prevent sudden calls by armed forces, disrupting distribution, placing unexpected demand on transportation, nullifying civilian supply machinery. . . . Program fits into assurances given PIWC that military demand figures will be supplied, as far ahead as possible and as inclusive as war permits. . . . Aviation fuel, aircraft engine oils and special lubricants excepted from new Army petroleum-procurement setup. . . .

DEMAND— Bureau of Mines places June demand for crude at 3,960,000 bbl. daily. . . . Points to necessity for adding to storage this year, contrasted to liquidation of 31,000,000 bbl. in all oils second quarter of last year. . . . Further gains in production and refinery operations "seem essential" in third quarter. . . .

PRODUCTION—PIWC warns that 155,000 tons of steel allocated by WPB for new drilling likely to be insufficient for 4,300 desired wells. . . . Application pending for additional 45,000 tons. . . . Much depends on further liquidation of inventories, extent of reclamation. . . .

Here's how War Emergency Pipelines, Inc., spanned the flooded Arkansas River with a 20-in. emergency bypass line supported by a railroad bridge. Virtually capacity runs were resumed less than a week after the break by this ingenious application of engineering skill

International News Photo

Polymerized refinery gases—codimer—from 45 United States refineries are hydrogenated to isoparaffinic aviation gasoline stock—hydrocodimer—in this high-pressure hydrogenation unit, left, the largest in the world. One of these fluid catalyst-cracking units, right, has been in operation for a year, making 100-octane number aviation base stock, isoparaffins, etc., for war products. In background, two new improved units are under construction

Coastal War Plants Praised by Officials

by Arch L. Foster

HOUSTON, Tex.—Leaving the immense war-products facilities of Baton Rouge behind after inspecting them last week, the government party, headed by Rubber Director William M. Jeffers, War Undersecretary Robert P. Patterson, Navy Undersecretary James Forrestal, and PAW Deputy Administrator Ralph Davies turned their planes westward to continue the inspection tour of war-products plants and shipbuilding activities and to determine their rate of progress. While in Baton Rouge they inspected the newly commissioned 30,000-ton synthetic-rubber unit, and the enormous installation for producing rubber intermediates, other synthetic rubbers and aviation-fuel components. The capacities of synthetic rubber, aviation fuel and other war-products plants in the coastal area are said to equal approximately one-half the country's requirements for such products made from petroleum and its components.

From Baton Rouge the party went to visit the large new Cities Service Refining Co. plant at Lake Charles, La., where a 55,000-ton unit for making butadiene from butene-butane refinery gases is under construction. At Port Arthur and Beaumont, Tex., they visited war-products units making aviation gasoline, synthetic rubber and their components in the plants of the Texas Co., Gulf Refining Co., Neches Butane Products Co. (which plant alone expects to be producing 100,000 tons of butadiene per year starting in July or August), Pure Oil Co., Atlantic Refining Co., and Magnolia Petroleum Co., in one of the most concentrated war-products areas in the country. Later they inspected the long list of similar plants at the refineries of the Shell Oil Co., Inc., Humble Oil & Refining Co., the Texas Co., Sinclair Refining Co., Pan American Refining Corp., Southport Petroleum Co., and Republic Refining Co., in the vicinity of Houston and Texas City, Tex. These companies are operating and building nearly 300,000 tons of butadiene capacity, with undisclosed but huge capacities for 100-octane aviation fuels, lubricants and other petroleum products vital to the war program.

Butadiene for making buna-S rubber is made in this plant, designed and built before Pearl Harbor. The technology and "know how" learned in this and other companies' plants before war started has prevented the critical rubber situation from being fatal

At Houston, the party separated into several groups. Some returned to Washington or the East. Messrs. Jeffers, Patterson and others were joined by K. S. Adams, president, and Dr. G. G. Oberfell, vice president of Phillips Petroleum Co., and conducted to Borger, Tex., where the 45,000-ton butadiene unit of Phillips, the government-owned, Hycar Chemical Co.-operated synthetic-rubber unit, and the large installations of the Phillips company for producing other war products were inspected. From Borger the leaders of the group will continue to the West Coast to complete their nation-wide tour.

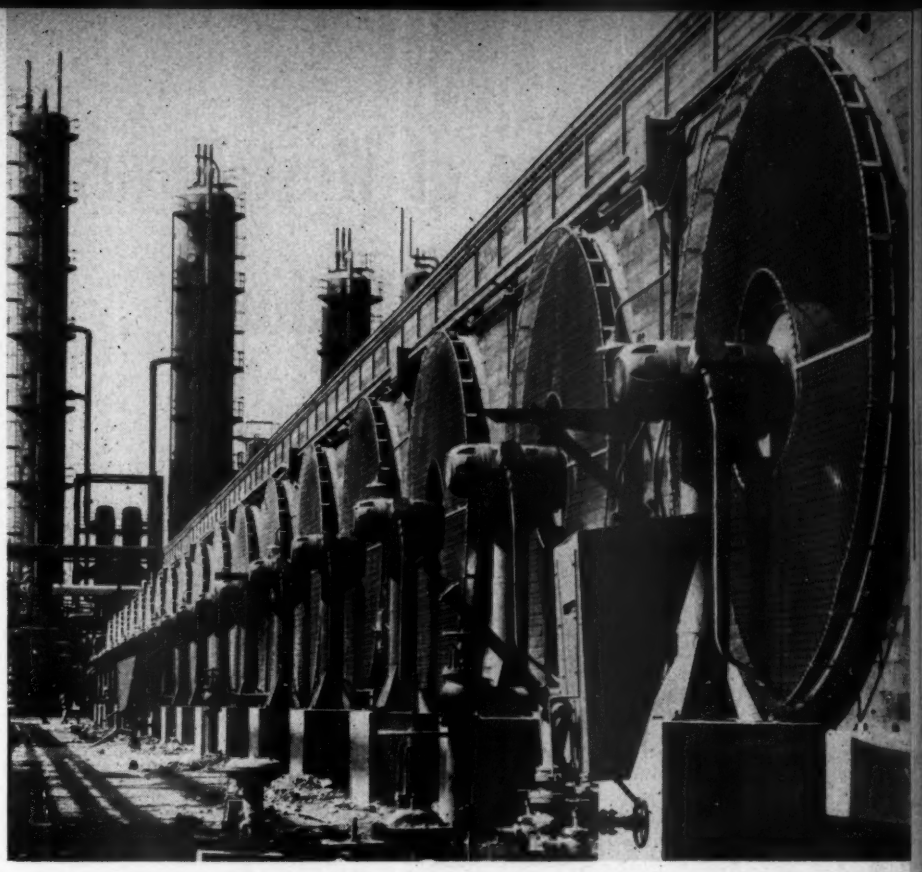
Almost universal approval of the progress shown by these numerous plants was expressed by the officials at different points in the tour. They found that the 30,000-ton buna-S (tire type) rubber unit at Baton Rouge was producing at capacity rate within 2 weeks after going on stream. In some

of the units seen, because of simplification of process and reduction in amount of equipment needed, steel tonnage has been reduced materially. This is especially true of catalytic cracking and other aviation-fuel-component units. Because of improvements in processing and the partial or complete removal of bottlenecks, increases in throughput as high as 25 per cent above rated capacity are expected, according to statements of qualified technologists.

The 100,000-ton butadiene installation at Port Neches, Tex., operated by a company composed of the Texas Co., Gulf Refining Co., Magnolia Petroleum Co., Atlantic Refining Co. and Pure Oil Co., is expected to go into operation in July or August, the date depending on the dates of delivery of some equipment vital to the construction and operation of the units. No announcement was made regarding the state of progress on several other plants for making butadiene, styrene, etc., in this area, such as those operating or building by Monsanto Chemical, Carbide & Carbon Chemicals, Dow Chemical and others. General information, however, indicates that these plants, too, are moving along satisfactorily.

Estimates of the cost of synthetic rubber from petroleum and other raw materials have varied considerably. Figures varying from 30 cents per pound upward have been made for rubber made this year in new plants. Next year it is estimated that this cost will be pulled down substantially, because of process improvements, simplifications, reduction of equipment required, amortization and other factors. In 1944 this cost may go as low as 20 cents per pound. Eventually it may be produced for around 15 cents per pound.

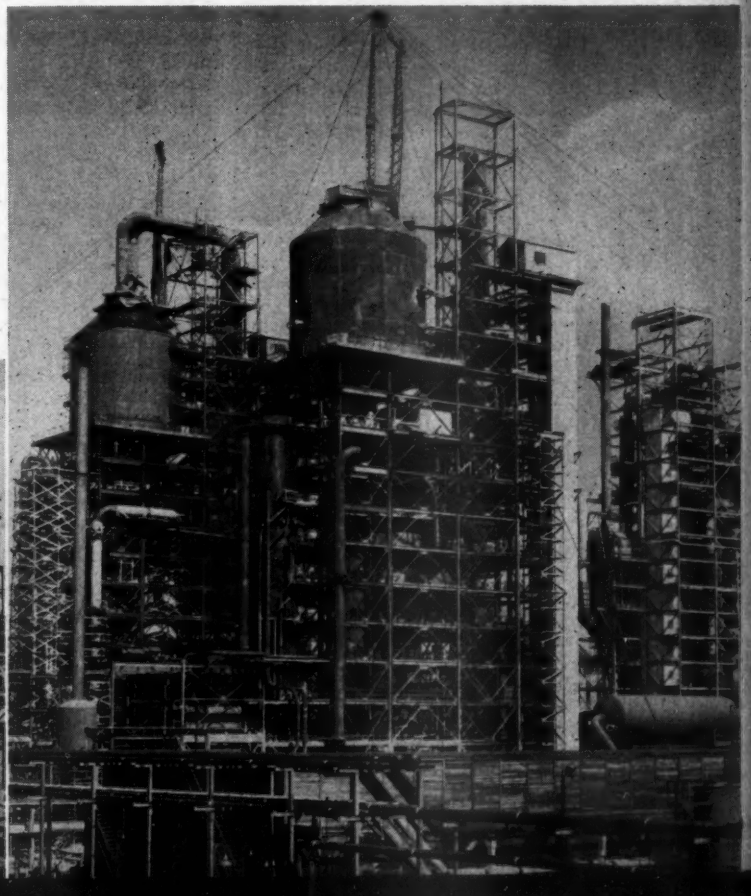
In production of both aviation fuel and synthetic rubber and their components one of the most cheering situations is that of improvements in plant operations and process details which have already been effected. This is true not in isolated plants here and there but in practically every plant investigated.

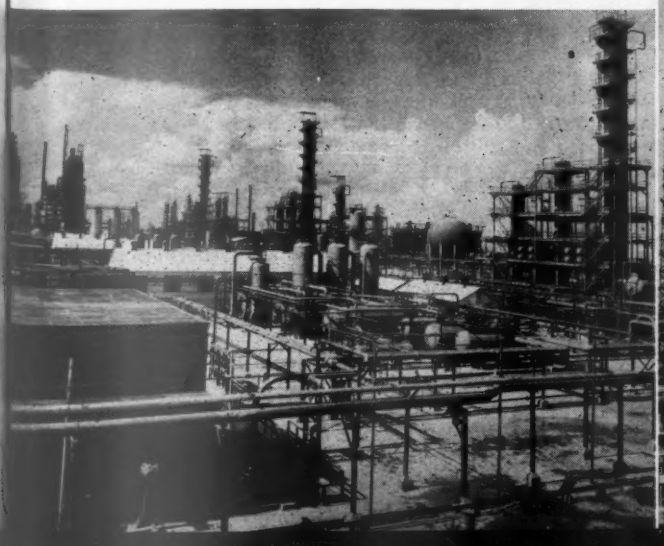


A concrete idea of the utilities requirements for modern refining processes is obtained from this view of a single mammoth water-cooling unit in the Baton Rouge refinery. Twenty huge fans force air through the descending water sprays to cool the water for process uses

Closeup of two catalytic-cracking units under construction. Their capacity is not announced. They are taller than a 16-story building, use several thousand tons of steel, produce aviation-fuel and rubber components, toluene and isoparaffins

Alkylation is the newest method for producing the most important component of aviation fuel; the process is carried out in the plant below in Standard of Louisiana's Baton Rouge refinery, with sulfuric-acid catalyst





Importance of West Texas Ordovician in National Picture Still Not Clear

by Harry F. Simons

THE place of the Ordovician formations in the West Texas and the national oil picture still remains to be proven although by the end of this year it should be fairly well established. Developments so far indicate that it is important but the question of just how important it is from an oil reserve standpoint remains to be answered. This uncertainty is due to the lack of sufficient information for the geologists to pick the structures most likely to produce or to determine the probable extent of these pools.

Further development of the recently discovered pools in Winkler and Ward counties will provide the needed data for future Ordovician prospecting in the Permian basin. With these pools developed, or outlined, the relationship between the younger Permian beds and the older Ordovician beds may be fairly well established and a better estimate can then be made on the type and size of the Permian structure which will make a good Ordovician prospect.

Drilling to the Ordovician has been sufficiently widespread to establish several facts. The principal ones developed so far concern the type of Permian field which makes the best Ordovician possibility, the size of the Ordovician structure in relation to the Permian relief and the thickness of the Ellenburger pay.

Numerous Structures Untested

Where Ordovician oil has been found under the fields producing from the Permian, the structure in which the oil is trapped has been an anticline. More definitely, it has been a rather broad and gentle anticline when contoured on the Permian. Fortunately, much of the present Permian production is from structures of this type and extent. On the other hand a number of the Permian structures are small and steep and in addition there is considerable Permian production from reef line and stratigraphic trap-type fields. These latter may have some possibilities for deep production but so far they have not been tested and geologists consider it too great a risk at present.

As far as the size of the Ordovician structures in relation to the Permian structures is concerned, it has been found that the sharpening of the relief with depth is very marked. A broad and gentle anticline contoured on the Yates sand or the San Andres lime becames a sharp and steep one on the Ellenburger. Establishment of the exact relationship between the two structures is the problem on which hinges the evaluation of Ordovician prospects.

Some geologists are currently using a relationship of 10 to 1. Where the Permian shows a relief of 10 ft., the Ordovician is estimated as having a relief of 100 ft. and 40-ft. closure on the Permian would give 400 ft. on the Ordovician. There is more than considerable argument about whether this relationship holds but it is definitely indicated that the Ordovician structures will not have the extent of the reservoirs of the younger beds.

Recent success in obtaining production from the Ellenburger in Winkler County following the discovery of deep production northeast of Monahans, Ward County, by Shell Oil Co., Inc., late last year, has directed attention to the possibilities of Ordovician pays in the West Texas area. Details on the new Winkler County wells either completed or showing for producers in the Ellenburger have been reported in recent issues of the Journal's Exploration and Drilling Section. The Barnhart pool was discussed in the March 18, 1943, issue, the Embar field in the March 4, 1943, issue, and the Abell field in the April 9, 1942, issue.

This does not mean that the extent of the Ordovician fields will be one-tenth that of the Permian fields as the pay thickness above the water would materially affect the area of the pool.

The steepening of the structures with depth has led some to believe that only the Permian fields producing from broad anticlines will make good Ordovician prospects. If the hypothesis is true, however, the Ordovician possibilities are not dimmed particularly as a number of structures which do not have sufficient closure in the Permian beds to be productive there might be steep enough in the older formations to form good traps.

The Barnhart pool in Reagan County and the Embar pool in Andrews County afford something of an example. The former does not produce from the Permian pays and the uppermost pay in the latter field (San Andres lime) is not noted for its producing ability in that particular pool. The deep Permian pay at Embar (Tubb) has a better defined structure than the San Andres and is a fairly prolific producing zone.

Order of Exploration

At the present time it would appear that the large Permian anticlines which produce at present would receive the most attention, followed by sharper Permian structures which produce, the broader nonproductive Permian structures and finally the reef line and lenticular sand pools.

Determining the Ordovician structural conditions is extremely difficult, as one learns on talking to several geologists familiar with the area. There is practically no agreement on any one specific case and there is practically as many convictions as there are geologists, and all have considerable fact to support their contentions. For instance there are the Keystone Ordovician and the Kermit (West Keystone) Ordovician pools, only a short distance apart. It is generally conceded that each well is on a separate structure because of the difference in subsea depth to the Ellenburger and the difference in the section penetrated. That one of the structures is considerably larger than the other, there seems to be no doubt, but some contend one well is on the larger structure and others state just the opposite. It is more than an academic argument as on the determination of the Ordovician beds in relation to the Permian beds rests to a great extent the future course of deeper prospecting in the area. So far practically all of the geology has been based an subsurface contouring developed from drilling to the Permian pays. Seismograph has been used to a limited extent and will probably be more widely used in the future.

Thickness of the Ellenburger pay has been encouraging to date and granting that the Ordovician fields

will be smaller than the Permian ones, it does not mean that the production from the latter will overshadow the former. The Ellenburger pay seems to have reasonable uniformity, in most cases a well-developed gas cap and probably an effective water drive. This would lead to the conclusion that the recovery per acre-foot would be comparable to the average good lime pay field and with a pay thickness from 80 to 150 ft. in the Ellenburger, it follows that the recovery per acre and per well will be quite high. Granting the 10 to 1 ratio between the structure contours but considering that the pay thickness in the Ordovician might be five times that of the Permian would result in a deep pool with one-half the recovery of the shallow pool.

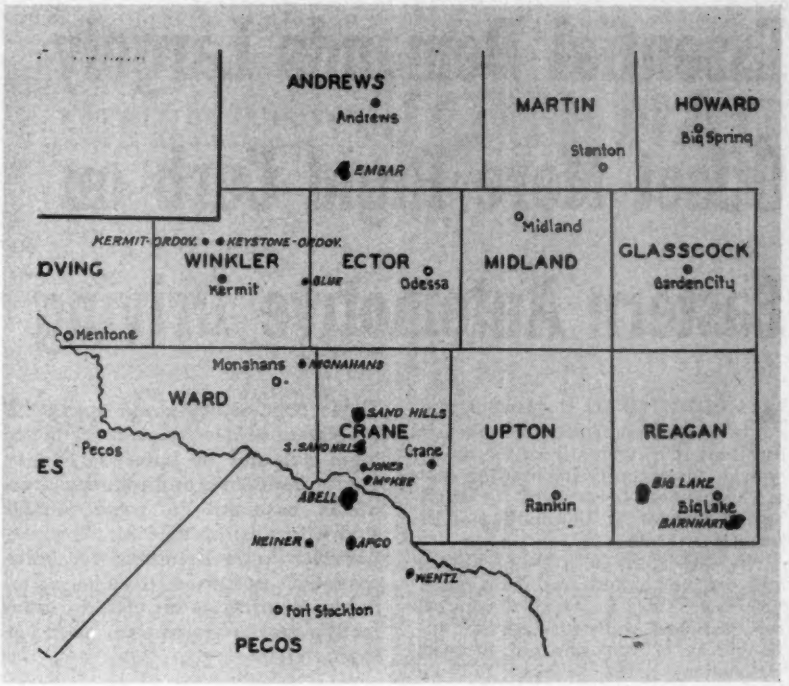
Intermediate Pays Important

While recent successes in the Ellenburger have concentrated interest on that formation, the possibilities of other Ordovician pays and of the pays below the San Andres and above the Ellenburger should not be neglected. (The Abell field produces from the McKee sand, Simpson, and the granite wash produces in the Apco pool. Both pools are in Pecos County.) Practically all of the wells drilled to the Ellenburger have shown possible production in the upper formations.

So far, with the exception of one pool, the drilling to the Ordovician has not been extremely difficult although it has been costly. The cost in any pool will naturally decline as development progresses. Wells drilled beyond 10,000 ft. to date have cost in the neighborhood of $350,000 but further drilling in the same area will probably see this reduced to around $150,000 and eventually much less. In the interest of safety and flexibility, large-diameter casing has generally been used when completing discovery wells. Subsequent wells will probably use smaller pipe and less steel.

Casing off the Permian salt beds appears to be the key to successful drilling to the lower formations. While it eventually may be possible to eliminate the intermediate string of casing, it is a good investment at present as it permits the necessary mud conditioning for drilling the lower portion of the hole.

Those interested in West Texas firmly believe that it is in for an era of prospecting to the Ellenburger with the presence of upper pays being logged en route and that this development will more than overshadow oil-producing history of the area to date. All are anticipating a strengthening of the market for West Texas oil and the price obtained for it. (All of the deep production is high gravity crude.) The liquidation of the approximately 4,000,000 bbl. of West Texas crude stored in the Gulf Coast and the 12,500,000 bbl. stored in West Texas will not take long at the present rate of delivery to the War Emergency pipe line. With ample market developing and plenty of area in which to drill, the future appears as green as the desert after a rainy spring.



The wells at Keystone and at Blue have not yet been completed, the former having experienced mechanical difficulties and the latter not yet having completed coring the pay

Tighter Midwest Rationing Hinted

WASHINGTON, D. C.—Admission that the Petroleum Administration for War is working on a program for curtailing gasoline consumption in the Middle West below that required to conserve rubber was made here June 7 by J. B. Parten, director of transportation, testifying before an unofficial committee of congressmen from the northeastern states where pleasure driving is now banned.

This committee was demanding action to spread the hardship to other areas as a possible means of providing more gasoline for the eastern seaboard when Mr. Parten disclosed that PAW is already working on the plan and may very shortly make a recommendation to the War Production Board that the Office of Price Administration be instructed to reduce the gasoline ration in certain other areas. He said that in his personal opinion pleasure driving should be prohibited throughout the United States.

Behind this disclosure lies the fact that during recent weeks until interrupted by the Midwest floods, transportation has been available to move out of District 2 more petroleum products than in the past and plans were under way to do this. Heretofore, easterners' demands for tighter rationing in the Midwest have been met with the statement that transportation was not available to bring more products eastward even if made available by tighter rationing. This situation has been changed by a number of factors which have come to a head almost simultaneously, including opening of navigation on the Great Lakes and New York Barge Canal.

District 2 is now barely able to supply its own gasoline needs so it is obvious that additional shipments to the seaboard will mean a reduction in rations to motorists. The amount of curtailment and area to be affected have not yet been decided by PAW, but it might apply to the entire District 2 or perhaps to all states east of the Mississippi River. Under present procedure PAW would notify WPB of supplies available for local consumption in a certain area and OPA would be directed to apportion this out by whatever rationing system it desired, whether by a ban on pleasure driving, reduction of all coupon values, or otherwise.

Essential Demands Largely Offset More Rigid Curb on Eastern Automotive Driving

These conclusions stand out in the Bureau of Mines' forecast of petroleum demand in June: (1) Higher crude production and refinery operations essential to raise fuel-oil stocks to desirable level; (2) unexpectedly large demands for other essential purposes largely offset tighter restrictions on civilian automotive use in the eastern shortage area.

WASHINGTON, D. C.—Unexpectedly large demands for essential purposes may virtually offset tighter restrictions recently imposed on eastern consumers because of the shortage of gasoline, in the opinion of the Bureau of Mines.

"Further gains in crude production and refinery operations seem essential in the third quarter," the bureau said last week in its forecast for June, "if stocks of fuel oils are to reach satisfactory levels to meet fall and winter demand."

The forecast, prepared under the supervision of A. G. White, chief, petroleum economics division of the bureau, sets market demand for crude oil this month at 3,960,000 bbl. daily, 228,600 bbl., or 6 per cent, higher than the actual output for June 1942.

The total demand for motor fuel in the second quarter, the bureau reported on the basis of such current data as are available, may be between 5 and 6 per cent less than in the second quarter of 1942. This smaller decline, compared to a reduction of 18 per cent in the first quarter, reflects the progressive decrease in civilian consumption last year and the steady rise in current war requirements.

Stock Increase Recommended

"While the total demand for all oils is expected to be between 1 and 2 per cent less than in the second quarter of 1942," the bureau report points out, "the anticipated gain in demand for crude petroleum is due to the necessity for a substantial increase in the depleted stocks of all oils this year as compared to a reduction of about 31,000,000 bbl. in the stocks in the second quarter of 1942."

Desirability of halting the liquidation of stocks and a reversal in the trend of aboveground inventories expressed in the bureau report confirms the course charted by the industry's economists.

Abnormal variations in monthly demand, caused by fluctuations in export and war requirements and by the emergency restrictions on civilian consumption have obscured recent trends, the bureau observed.

Refinery production of 46,100,000 bbl. of gasoline, augmented by 1,700,000 bbl. of benzene and direct sales of natural gasoline, forecast by the bureau during June, provides for a reduction of 3,300,000 bbl. in stocks to meet the predicted demand of 51,100,000 bbl.

Larger demand for crude in May than was anticipated apparently will offset the failure of April requirements to equal the bureau's forecast. And the bureau expects the demand to equal or exceed its forecasts for the second quarter, indicating that its June calculations may be on the conservative side.

Petroleum Division of A.S.M.E. to Hear Six Papers

Six outstanding papers have been arranged for the annual meeting of the Petroleum Division, American Society of Mechanical Engineers, which will be held this year at Los Angeles, Calif., June 17.

Papers on the program deal with refinery, pipe line, drilling, producing and maintenance subjects.

The Program

"Requirements for Relief of Overpressure in Vessels Exposed to Fire" by James J. Duggan, C. H. Gilmour and P. F. Fisher of the Carbide & Carbon Chemicals Corp.

"High Pressure Pipe Line Research" by F. W. Laverty and F. M. McNall, Clark Brothers Co., Inc.

"Interpretation of Analytical and Volumetric Data in Terms of Field Measurements," by Dr. B. H. Sage and R. H. Olds of the California Institute of Technology.

"Southern California Gas Company's Butadiene Plant," by J. G. Rollow and H. L. Masser of the Southern California Gas Co.

"Portable Drilling and Servicing Machines," by James Moon, Franks Manufacturing Corp., and Hillman-Kelley, Inc.

"Engine Wear and Its Measurement in the Study of Lubrication," by A. G. Cattaneo and W. Gasser, Shell Development Co.

SUMMARY OF FORECASTS FOR JUNE 1943

(Barrels)

	Forecast June 1943	Forecast May 1943	Actual June 1942
Demand for motor fuel:*	51,100,000	49,400,000	53,319,000
Supply of motor fuel:			
Straightrun and cracked	41,510,000	42,550,000	39,827,000
Natural gasoline used at refineries	4,590,000	4,650,000	4,423,000
Total refinery production	46,100,000	47,200,000	44,250,000
Other natural gasoline and imports	1,700,000	1,600,000	1,688,000
Decrease in finished stocks	3,300,000	600,000	7,381,000
Available supply	51,100,000	49,400,000	53,319,000
Crude-oil requirements:			
Per cent yield of gasoline from crude	37.00	37.00	37.80
Refinery crude required	112,200,000	115,000,000	105,376,000
Daily average	3,740,000	3,709,700	3,512,500
Domestic crude runs	112,000,000	114,800,000	104,756,000
Exports and fuel and losses	6,800,000	6,700,000	7,186,000
Total demand for domestic crude	118,800,000	121,500,000	111,942,000
Daily average	3,960,000	3,919,400	3,731,400
Decrease in domestic stocks	.....	.....	3,347,000
Actual production	.....	.....	108,595,000
Daily average	.....	.....	3,619,800

*The term "motor fuel" as used in this report includes gasoline and naphtha used for all purposes, but does not include heavier distillates used in the operation of tractors or burned in diesel engines.

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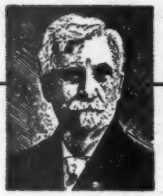


BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Users Must Have Facts

THOSE who have spent days and weeks preparing surveys and making reports to war agencies and legislative committees showing the need for higher prices and more materials for oil operations probably will not take kindly to the suggestion that anything has been left undone.

Unfortunately what has been done in presenting the case isn't enough. Unless all signs fail the consuming public in additional areas will shortly be ordered to further curtail their use of gasoline—not to conserve rubber but because of deficiencies in petroleum supplies.

Naturally 125 million consumers in this country outside the military who are accustomed to consume an average per capita of 10 barrels of petroleum yearly will want to know what is wrong. If they are told in a comprehensive manner there is every reason to believe that they will do something about it.

A well-enlightened public does not have to waste its time knocking on Washington's thousands of official doors to get what it needs and wants.

If they are not accurately informed users will continue to listen to the political soothsayers and bureaucratic opportunists while the web of permanent regimentation tightens around this industry and petroleum's leadership in American enterprise will end for all time.

The fact that the public generally does not understand the significance of the 20-billion-barrel proven reserves in this country, bobs up daily. The same situation applies to many military leaders and the heads of certain war agencies.

To individual consumers who have little conception of the magnitude of their collective requirements the reserve is a guarantee of sufficient oil for the war and later. These consumers must understand that the reserve is not the same as 100-million bushels of wheat in the granaries.

They must realize that it will take years to bring most of this oil to the surface. It is storage only in the sense that its presence is definitely known with a varying scale of recovery costs which means that a large part of the reserve will stay in the producing horizons permanently at present prices.

This same public must be informed in language it can understand that the oil business does not differ from agriculture and all industrial enterprises in that war operations cannot be maintained on prewar returns. The additions to the proven reserves coming from new fields which over past 3 years have not kept pace with withdrawals by a wide margin represent much higher costs than the discoveries of the previous decade.

There is also need for an educational program directed to consumers in regard to earnings. There is evidence in some cases that the earnings of producing companies are due in part to a war situation in which they have not been able to make the normal chargeoffs because of restricted operations under the government program. This in effect means that current earnings represent the liquidation of capital assets. So long as proven reserves are not being maintained in line with current output this type of liquidation applies to the entire industry.

The war has made the entire nation tremendously oil conscious. Now is the time for the petroleum industry to present its entire case to its public which includes everybody. Therein lies the only assured protection for consumers and producers.

Details of Hugoton-Blackwell Pipe Line Depend on Negotiations Now Under Way

by Paul Reed

THE location of the compressor station for the 240-mile 26-in. natural-gas pipe line to be built by Cities Service Transportation & Chemical Co. from the Hugoton field to Blackwell, Okla., will depend on decision reached at conferences with PAW in Washington, D. C., last week. PAW is concerned with having the project planned so that steel for pipe may be used economically because of wartime requirements and at the same time conform with policies for ratable taking of gas, which have received attention in recent weeks.

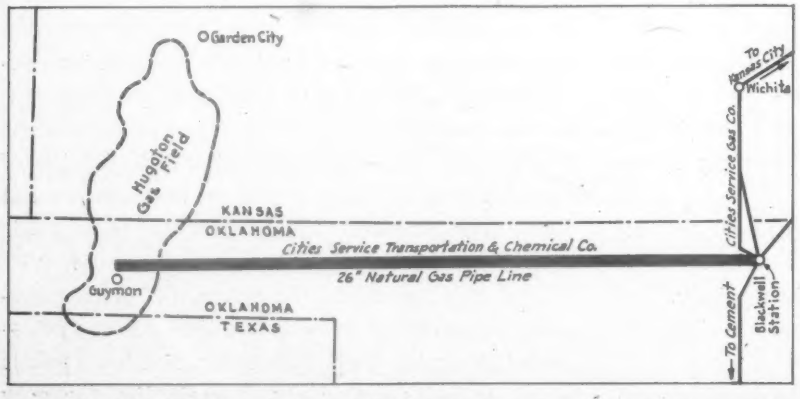
With one station equipped with compressor units of 8,000 hp. at the end of the line near Guymon, Okla., the line will transmit between 130,000,000 and 140,000,000 cu. ft. daily. It is believed that a campaign involving the drilling of from 68 to 78 wells in Texas County, Oklahoma, will be required for this program. With further drilling and the building of additional stations, throughput of the line could be raised to 250,000,000 cu. ft. Estimates of expenditures of $16,000,000 to $18,000,000 for the project are said to include the drilling of wells, building the new 26-in. line and looping of the present Cities Service Gas Co. trunk line extending north through the vicinity of Blackwell.

Certain affairs of the project were being handled last week by Clay Briggs, chief engineer, Cities Service Oil Co., who is serving as agent for Cities Service Co. until the organization of the new company is completed. Offices were opened by him June 7 in the Masonic Building, Ponca City, Okla., for a staff with three engineers: R. A. Axe, H. R. Parks and B. D. (Tex) Luety; as well as F. H. Bacon, attorney; Carleton L. Bailey, treasury department, and M. H. Diels, secretary. No plans are reported as being considered for the building of a chemical plant for the project as now contemplated.

Steel for the electric welded pipe for the 26-in. line probably will not be available until September. An effort will be made to have contractors complete the line early in December.

Culminates Long Effort

The Hugoton-Blackwell pipe-line project is materializing after extensive negotiations to handle transmission of gas from the Hugoton field in a manner acceptable both to Kansas and Oklahoma operators. Objections have been raised by Kansas gas men to having gas for Kansas markets come from Oklahoma as well as to plans for assigning casing to the Texas County, Oklahoma, development program which had been destined for Kansas wells. As the result of conferences, orders have been issued both by Kansas and Oklahoma authorities assuring similar procedures for drilling and gas withdrawal based on sound engineering principles.



Route of the 240-mile, 26-in. natural-gas pipe line to be built by Cities Service Transportation & Chemical Co. to Cities Service Gas Co. trunk line compressor station at Blackwell, Okla.

The Hugoton field, now believed to extend from Sherman County, Texas, to Garden City, Kans., is 125 miles long and 35 miles wide. Estimates of gas reserves of the Hugoton field vary from 15 to 24 trillion cubic feet; a reasonable estimate is said to be 20 trillion for the Hugoton field and 19 trillion for the Texas Panhandle. Of this reserve in the Hugoton field, Cities Service Gas Co. has 2 trillion 100 billion cubic feet held under 65,000 acres of mineral rights and under a total of 105,000 leased acres, consisting of 90,000 acres in Oklahoma and 15,000 acres in Kansas. An important part of the company's holdings is the Stonebreaker ranch of 56,000 acres. It is reported that the company has 30 years' supply of gas in the Texas Panhandle and Hugoton areas.

Some of those who have observed the steps taken to regulate withdrawal of gas from the Hugoton field, according to ratable take, assert that these indicate adoption of policies in gas transmission which are comparable to those for crude-oil transportation in Oklahoma about 1915. The function to be performed by the Oklahoma Corporation Commission has been clarified in the order issued May 5, 1943, providing a uniform method of determining ratable taking of gas. If the federal authorities, in granting permits to drill and through control of material, will see that each lease owner in Texas County, Oklahoma, gets the proportion of wells which his acreage bears to the common reservoir, it is said that the commission will be able to handle control of ratable withdrawals. Oklahoma law fixes the title of gas in place under the land.

Although a large part of the development in Texas County will be on Cities Service property because of the exigencies of the situation, it is believed that ratable take will be enforced this year along the pipeline route. Later, when more steel becomes available for gathering lines, it is likely that ratable take will be extended to other producers in the field.

The Oklahoma order of May 5, 1943, providing for ratable take in the Hugoton field, specifies the drilling of one well per 640 acres. A for-

mula for allocating the production of gas in the field considers acreage and deliverability of a well determined by its ability to deliver gas against 80 per cent of the average field pressure. To arrive at the amount of gas which should be produced from each well for any allowable period, a field-proration factor will be determined by dividing the total anticipated production from the field for such a period by the sum of the product of deliverability times the acreage factor for all the wells in the field. The field proration factor will be multiplied by the product of deliverability times the acreage factor for each well. The result reached by this calculation will constitute the well's anticipated allowable in cubic feet for a proration period.

Specific Ceiling Prices Set at Gulf Refineries

WASHINGTON, D. C.—Differential of 0.5 cent per gallon previously permitted nonintegrated refiners on the Gulf Coast on regular grades of gasoline were abolished last week by the Office of Price Administration. Specific dollars-and-cents ceiling prices were established by OPA, effective June 9, on a group of petroleum products when sold by refiners at Texas and Louisiana Gulf ports and at shipping points in the New Orleans area for delivery to states in PAW District 1.

These ceilings, embodied in Amendment 106 to Revised Price Schedule 88 (Petroleum and Petroleum Products), make no change in existing maximum prices as they have been observed in actual practice, OPA said. The list follows:

	Max. price f.o.b.*
Motor gasolines:	
80-82 octane, A.S.T.M., Ethyl grade	6.750
80 octane, '39 Research, leaded (max. 2 cc.)	6.000
72-74 octane, A.S.T.M., leaded	5.750
68-70 octane, A.S.T.M., unleaded	5.750
65-67 octane, A.S.T.M., unleaded	5.250
60-64 octane, A.S.T.M., unleaded	5.000
Distillate fuel oils:	
Kerosene, water white (41 gravity and above)	4.125
Range oil	3.875
No. 1 fuel oil	3.875
No. 2 fuel oil	3.750
No. 3 fuel oil	3.750
Gas oils:	
Diesel index 58 and above	4.250
Diesel index 53-57	4.125
Diesel index 52 and below	4.000

*Cents per gallon.

It is stipulated that where delivery is into pipe line, tank car, motor transport or tank wagon (and in addition in the New Orleans area into barge) for shipments to ultimate destinations other than District 1, the seller may charge his maximum prices under other sections of Schedule 88 whichever may be higher. The New Orleans area means Mississippi River ports up to and including Baton Rouge.

Federal Order Digest

PAW Directives

Distribution—PAD 57: Revoked because Directives 65 and 67 divide midwestern and southwestern territory into distribution zones, eliminating necessity for less specific tank-car regulation, effective June 5.

Distribution—PAD 68: Authorizes district committees on joint use of marketing facilities to promote voluntary arrangement among suppliers, providing maximum utilization of transportation equipment, effective June 7.

WPB Regulations

Priorities—PR 1, Interpretation 2: Rules that "regular established prices" as used in PR 1 cannot be regarded as higher than the ceiling prices fixed by OPA, issued June 2.

Pipe Line—Allocates 44,600 tons of steel for 383-mile 16-in. line from Sundown, Tex., to Drumright, Okla., to be constructed by Stanolind Pipe Line Co.

Controlled Materials — CMPR 1, amended: Eliminates monthly percentage restrictions heretofore imposed on placement of controlled material orders, issued May 28.

Scheduling Procedure—Inaugurates Component Scheduling Procedure by which industry will move toward production on a time-table basis; aims at eliminating maldistribution, lags between time components are required for construction and time they are available; authorizes use of Form PD-903, issued June 1.

Priorities — Simplifies system of identifying WPB forms by combining several forms, changing method of identifying symbols, issued June 6.

OPA Price Actions

Petroleum Products — RPS 88, Amendment 106: Establishes dollars-and-cents ceiling prices on a group of products when sold by refiners at Louisiana and Texas Gulf Coast refineries, ports and terminals, effective June 7.

Crude Oil — RPS 88, Amendment 105: Creates gravity table of price ceilings, ranging from 89 cents to $1.05 for Aliso Canyon field in California, effective June 7.

Cracking Catalysts — GMPR, Rev. SR 1, Amendment 11: Removes price control from cracking catalysts sold for use in the manufacture of aviation gasoline, effective June 11.

OPA Rationing Orders

Mileage — RO 5c, Amendment 52: Provides method by which motorists depending on cars for transportation to work can "break" the B mileage ceiling, effective June 7.

Rubber — RO 1a, Amendment 31: Enables operators of fleets of commercial and nonhighway vehicles to file single applications for rationing certificates covering their aggregate tire needs, effective June 9.

Mileage—RO 5c, Amendment 53: Empowers district directors to require distribution of gasoline on priority basis or under such limitations as necessary to insure adequate supplies of gasoline for services essential to public welfare, effective June 2.

Fuel Oil—Simple form announced covering next winter's rationing system in 33 states and the District of Columbia, to be handled by mail.

Fuel Oil—RO 11, Amendment 66: Qualifies consumer who is entitled to buy new oil stove, but instead acquires used stove, for fuel-oil ration, effective June 10.

OPA Appointments

Price Department—Donald Wallace and A. C. Hoffman, as deputy administrators in charge of prices, succeeding J. K. Galbraith, resigned, effective June 1.

Legal Division—Ellsworth E. Clark, as assistant general counsel, in charge of the rationing legal division, effective June 2.

ODT Regulations

Rental Cars—ODT 21, EO 2a: Consolidates Exemption Orders 21-2 and 21-6; removes rental cars from eligibility for certificates of war necessity, if hired for a period of 30 consecutive days or more, effective June 2.

Tire Inspection—ODT 21, Amendment 6, Subpart M: Allows a maximum period of 5,000 miles or 6 months, whichever occurs first, between inspections for commercial motor vehicles, effective June 1.

District Groups Given Added Distribution Power

WASHINGTON, D. C.—Petroleum Directive 68 was issued June 7 to provide maximum utilization of bulk plants and other transportation facilities to promote delivery of oil with the least possible use of equipment and manpower.

District committees on joint use of marketing facilities for the Petroleum Administration for War are authorized to promote voluntary arrangements among suppliers and bulk-plant operators to make effective plans which they have already prepared, without conflict with antitrust laws.

Sixty Topflight Oil Executives Given Demonstration of How Army Uses Fuel

by Henry D. Ralph

WASHINGTON, D. C.—Three score topflight executives of the oil industry of the nation learned about Army life the hard way by serving as "privates" in the Engineers Corps for 26 hours at Fort Belvoir, Va., June 2 and 3.

As guests of the War Department in a novel plan for cementing Army-industry relations, the oil men were bunked with soldiers in training and were treated like any other batch of recruits—well, almost like other recruits, for allowances were made for their age and physical condition, particularly after a 5-mile night hike through the woods.

There were 72 men in the party which left Washington Wednesday afternoon for Fort Belvoir, 20 miles away. Most of them were members of the Petroleum Industry War Council which had just completed its June meeting. The rest were oil company officials who had attended the council meeting as guests or were specially invited to make the trip, plus a few representatives of the Petroleum Administration for War and of the oil-trade press.

When the special car arrived at Fort Belvoir the visitors were met by the post band and were welcomed by the post commander, Brig. Gen. E. H. Marks. General Marks told them they would be treated like recruits but warned them that they probably could not stand the pace and told them they should feel free to disregard any orders at any time. This piece of advice was remembered and followed frequently before many hours of the rigorous regime.

Every minute of the 26 hours at the post was crammed full of action, and a carefully prepared schedule was followed like clockwork.

Issued Regular Equipment

The oil men were issued fatigue uniforms, foot lockers, bedding, and work gloves, and billeted with the Sixth Battalion of the Engineer Replacement Training Center, one of the several activities at this large post. Half a dozen of the "new men," as the noncoms called them, were put in each platoon barracks. The troops there were in their tenth week of a 12-week course which takes men from civilian life and fits them to join engineer combat units already in action on the foreign fronts. Most of the men were quite young, and their earnestness and understanding of their work greatly impressed the visitors.

First the visitors had to make up their own beds, Army style, wrinkle-free, and strictly according to the regulations. They lined up with their platoons and marched into the mess-hall, then carried their dishes to the kitchen, scraped them, and gave them a preliminary washing.

A movie was next on the schedule, but not the Hollywood variety. These were restricted films used by the Army in training men how to destroy tanks, how to shoot camouflaged snipers without exposing themselves, and other tricks of the soldier's trade. It was easy to see how such films, with realistic scenery and battle sound effects, contribute greatly to the intensified type of training which makes a fighting engineer out of a civilian in 3 months.

Next came what every rookie gets—a trip to the drill field for instruction in close-order drill. The oil men quickly learned how to stand at attention, dress their line, about face, march around corners, and salute. Then they were ready for the "night problem."

Assigned Night Problem

As darkness came on they were issued luminous compasses and briefly instructed in their use. Each visitor was assigned to a patrol of half a dozen trainees and marched away in groups over the roads and trails of the 10,000-acre post. When each patrol reached its objective a waiting officer directed it to report to a camouflaged pup tent in "enemy territory" so many hundred yards in a given compass direction. Off they went in pitch darkness, through woods, fields and swamps, up and down steep hills, over logs, rocks and barbed wire, counting paces and watching the luminous compass dots. Each patrol covered from 1 to 2 miles in this exercise, and had hiked about 5 miles by the time it got back to the barracks.

It was midnight when the party returned, and after coffee and doughnuts in the mess hall and a welcome cold shower the visitors flopped on their bunks, most of them too tired to sleep.

But at 5:30 the next morning they were up again, standing roll call with their platoons and doing the usual morning routine of any Army camp—making their beds, cleaning the bar-

Hillside shade was welcomed. Front row: B. L. Majewski, J. L. Dwyer, unidentified, and W. G. Skelly. Middle row: Ray Vir Den, J. W. Carnes, and Paul G. Blazer. Back row: J. S. Leach, W. Alton Jones and William R. Boyd, Jr.

Brig. Gen. Walter B. Pyron explaining Army life to William R. Boyd, Jr., Sylvester Dayson and J. S. Leach

racks, marching to mess, picking up trash in the yard, and doing the setting-up exercises including a strenuous tug-of-war among platoons.

It was then that the visitors began to take advantage of the general's permission to disregard orders. The drilling itself wasn't so bad, but the worst part was the rule against smoking in the ranks. Oil men and cigars seem to go together, and as soon as they had lighted up fresh stogies they would have to fall in again and the noncommissioned officers would yell, "No smoking in the ranks—throw away that cigar."

But the officers in charge took mercy on their guests and let them ride in Army trucks instead of marching with the troops to the scenes of the day's exercises. One company went to the rifle range for practice with rifles, light machine guns, and grenades; another built tank-carrying bridges of different types across a fair-sized stream; a third built light foot bridges, trestles, and fords at another point on the stream; while the fourth company built and demolished barbed-wire entanglements and planted and immunized antitank mines.

Schedule Modified

After lunch with the troops ("That stew was the most delicious food I ever tasted"), the oil men were "promoted" from the ranks and treated like guests. Real buses with seats and windows were provided (and smoking permitted), and the officers took the party on a tour of the post. They visited the command headquarters; rifle ranges where all got instructions in firing the Garand rifle and a chance to make a score on the targets; ranges where special weapons were demonstrated and where the troops were getting training in different types of actual combat firing; sites of bridge construction; bulldozers, rock drills, and other heavy equipment building simulated airports, tank traps, embankments, and other works.

Most interesting of all was a road in the deep woods where one company of trainees had spent all morning building several different types of timber barricades to stop tanks. A 30-ton "General Sherman" tank was brought up to test them, while fire and salvage crews stood ready in case of an accident. Huge logs and dust flew for many yards as the steel monster charged the road blocks, bouncing, swaying, standing on its tail, and nearly capsizing, while troops fired dummy ammunition at it from concealed fox holes in the woods. The big timbers were reduced to kindling wood by the churning tank treads, but in every case the tank was stopped dead in its tracks or delayed so long that it was counted as "destroyed" by the grenade fire.

The oil men shared the enthusiasm of the student engineers in this demonstration, and joined in the cheering when their handiwork succeeded in stopping the "enemy." The boys had been bragging and betting with the tank crew, and lustily yelled "Get a horse" when the tank stalled. They spoke confidently of their ability to cope with any sort of tank the enemy might hurl at them.

Then the "war" was over for the oil men. The top officers of the post took their hot and tired guests to the officers' club, and then they just had time to change to civilian clothes and turn in their equipment before making one last march to the parade grounds.

Utterly exhausted, the visiting party flopped into their railway coach to return to Washington, New York, California, Texas and other centers of oil activity. But they were not too tired to remember their hosts, and when the hat was passed nearly $1,000 was raised for the benefit of the camp recreation fund.

Lacey Walker, secretary of the A.P.I., and Henry D. Ralph, the Journal's Washington editor, in the turret of a tank

Robert E. Wilson and J. S. Bridwell help on the chain hoist in bridge-building maneuver

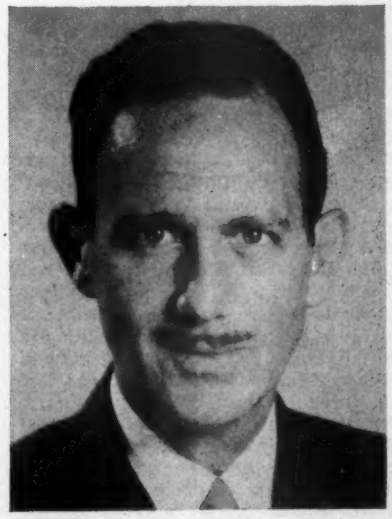
Journal Assigns E. H. Short, Jr., to Texas

E. H. SHORT, Jr., who for the past 18 years, has been connected with the production department of the Gulf Oil Corp., effective this week will be in charge of The Oil and Gas Journal's engineering office for the Gulf Coast and Southwest Texas areas with headquarters in Houston. He will specialize in the preparation of editorial material describing drilling, producing, and pipe-line engineering and operating developments in that area.

Born in Texas, Mr. Short has had wide practical experience in drilling and production operations. During his vacation period while attending high school and the University of Oklahoma he worked as pumper, roustabout, tooldresser and roughneck in the oil fields of Oklahoma and Texas.

He joined the Gulf organization in 1925 and had experience as a tooldresser and driller for that company. He was employed as a gas-lift engineer for a time and then served as a district engineer during 1927-32. His experience during this period included the selection of pumping equipment, well surveys, well cementing, and analyses of leases.

He joined the Tulsa staff of the company as production engineer in 1932. In 1939, he became a staff assistant in the executive department and served in that capacity until 1941 when he became head of the subsurface unit at the Tulsa office. His experience in the Tulsa headquarters covered a number of engineering and administrative duties connected with production operations.



E. H. SHORT, JR.

Manufacture of 100-Octane Fuel Encroaches on Diesel-Oil Volume

CLEVELAND, Ohio.—A prediction that diesel fuel oils will be on the critical list by 1944 was made here last week by Dr. C. M. Larson, chief consulting engineer, Sinclair Refining Co., New York, speaking before the Diesel Engine and Fuels and Lubricants meeting of the Society of Automotive Engineers. He said that even after the war the extremes between octanes for gasoline engines and cetanes for diesel engines will broaden in favor of high octanes to the detriment of diesel fuel ignition quality.

Blame for wear and fouling of diesel engines was shifted from lubricants to unsatisfactory fuels by G. H. Cloud and A. J. Blackwood Standard Oil Development Co., Elizabeth, N. J., who reported the results of pioneering research of the effects of fuel characteristics upon engine wear and fouling. They said the major diesel fuel characteristics governing fouling and wear are sulfur content, ignition quality and viscosity, or volatility. Sulfur content was held the most important. Sulfur, they said, converts during combustion into sulfur trioxide which attacks lubricating oil, produces sludge, varnish and carbon formation, and increases ring and cylinder wear.

Fuels of lower cetane number were found to reduce ignition quality, increase smoke and roughness but apparently exert no discernible influence on wear. On the other hand, little improvement in engine conditions results from using fuel of a cetane number higher than that necessary for smooth operation.

Development of a new test engine for preevaluating heavy-duty diesel lubricants has resulted in cutting test operating periods to 24 hours from 480, according to H. L. Moir, W. J. Backoff and N. D. Williams, Pure Oil Co., Chicago. They described a single-cylinder Fairbanks-Morse test engine which gives in 24 hours data correlating with those developed in 36-hour Chevrolet and 480-hour Caterpillar tests. S.A.E. 30 oils of the Gulf Coast type were reported in their paper to prolong ring sticking time to 17½ to 20 hours, compared with 8½ to 10 hours for Mid-Continent and 4½ to 9 hours for Pennsylvania, but produced extremely dirty pistons, badly stuck rings, and over-all engine sludge so difficult to remove that cleanliness had to be established as another characteristic to be considered in evaluating and producing heavy-duty type lubricants.

How the production of 100-octane gasoline changes the balance in manufacturing diesel fuels was described by Dr. Larson in terms of yields from plants of various capacities. Conversion of a 55,000 bbl. per day refinery to the production of 4,000 bbl. of 100-octane gasoline will result in the following changes, he said:

	Barrels per day manufactured	
	Without 100-octane	With 100-octane
Gasoline:		
72 octane*	13,000	13,000
80 octane*	8,000	8,000
100 octane*	None	4,000
Kerosene	4,000	3,000
No. 2 fuel	†8,000	‡5,000
No. 4 fuel	§1,000	None
Residual fuel	20,000	20,000
Misc. and gas	1,000	2,000

*Leaded fuel; †50 cetane; ‡40-45 cetane; §40 cetane.

Dr. Larson's postwar forecast indicated that premium grade gasolines will be 87-90 octane; regular grades, 80 octane, and third grades, 72-75 octane. Tractor or distillate fuels of 50 octane, 40 cetane, will be available, but in many regions tractor distillate fuels will have to be used with 37-40 cetane, or cetane additive agents will be employed to maintain the 50-cetane minimum called for by manufacturers of high-speed diesel engines.

Postwar automobiles will be small, lightweight editions fueled by high-octane, heavily taxed gasolines now available only for military aircraft and motorized equipment. Postwar manufacture of 100-plus octane gasolines will force engineers to design diesel engines which will get the utmost out of the low-cetane fuels for railroad, marine, long-distance and overseas air cargo and construction service, Dr. Larson said.

DEATHS

John Francis McLaughlin, 37, former resident of Bradford, Pa., and for several years an employe of Bradford Refining Co. in that city, died last week at Detroit, Mich., from injuries received when he suffered an electric shock and fell several feet. His widow and three children survive.

Lt. Paul Mock, employed at the Baytown, Tex., refinery of Humble Oil & Refining Co. when he enlisted in the Army Air Corps in October 1940, died in a Japanese prison camp, according to word received from the War Department.

Howard David Hanold, 45, oil-field employe in the Bradford field, died in a Buffalo, N. Y., hospital last week, after an illness of 6 months. He is survived by his widow, a son, three stepsons and a stepdaughter.

William LeRoy McLean, 56, for the past 16 years lease superintendent for H. J. Walter Oil Co. in the Bradford field, died at his home in Buchanan Hollow, Pa. He had been ill for a year. His widow survives.

Floyd L. Newton, 56, of League City, Tex., division construction foreman for Humble Pipe Line Co., died recently in a Galveston, Tex., hospital. Interment was in League City.

Franklin Pierce Thompson, 90, who was at one time associated with South Penn Oil Co. and for several years was with the South Group Lines as an accountant, died at Oil City, Pa., last week. He retired a number of years ago. One son survives.

William McCleary Potts, 87, president of Kewanee Oil Co., with headquarters in Philadelphia, Pa., died in a West Chester, Pa., hospital last week. He had been associated with Kewanee for more than 50 years, and had been president since 1911.

Jesse Hibbs, 73, who, with his brother, the late John J. Hibbs, drilled the first oil well in the Red Fork, Okla., area, died at his home in Joplin, Mo. He is survived by three sons and three daughters.

A. Walter Cole, 59, former superintendent of Wolf's Head Oil Refining Co., Oil City, Pa., died at his home in Reno, Pa., last week following an illness of 2 years. His widow, a son and a daughter survive.

William A. Fletcher, a retired Union Oil Co. employe, died at his home in Montebello, California. He retired in 1932. His widow, two daughters and three sons survive.

Fifteen New Seagoing Tankers Launched in May

WASHINGTON, D. C.—Fifteen seagoing tankers and one coastal-type oil carrier were included in another record-breaking month for production at American shipyards in May.

Seven of the seagoing tankers were completed at the Sun Shipbuilding & Dry Dock Co.'s yards in Chester, Pa. Kaiser Co., Inc., Swan Island, Portland, Ore., completed four, while Alabama Dry Dock & Shipbuilding Co., Mobile, Ala., and Bethlehem-Sparrows Point Shipyard, Inc., Sparrows Point, Mo., each completed two vessels.

Gravel Loading of Formation Increases Production of Jal Field Wells

by Harry F. Simons

A frequent difficulty in wells with a low fluid level is the caving of the formation in the uncased portion of the hole with the result that the hole is partially or completely plugged and the movement of oil into the well bore reduced. Gravel packing, in which variegated rock material is placed between the hole and a liner is a common remedy for this trouble. A New Mexico superintendent has developed a slightly different practice in that the hole is simply loaded with gravel to a point above the caving section. The method is simple, quick and inexpensive and the resulting increase in production from the wells is very encouraging.

THE use of gravel for packing the annular space between a liner and the hole has been comparatively common practice for a number of years. The object generally is to prevent the entry of particles of the formation into the well bore where they form a pack and shut off the oil production, either partially or completely. One company operating in New Mexico (Anderson-Prichard Oil Corp.) has developed a variation of this practice wherein part of the uncased portion of the hole is filled with pea gravel and to date it has resulted in a substantial increase in the production from the wells. Lee Denny, production superintendent for Anderson-Prichard in the Jal, New Mexico, district has been in charge of the work.

The conditions in the wells which led to the application of gravel loading is similar to those in which gravel packing between the hole and liner is used. The wells so treated are in the Jal, New Mexico, pool and produce from the Langley sand at approximately 3,450 to 3,500 ft. total depth. The total producing formation exposed is about 90 ft. in thickness with three or four stringers totaling 40 to 50 ft. of actual pay. Casing run in the wells was set and cemented at approximately 3,300 ft. leaving an additional 60 ft. of open hole consisting of lime, shale and some bentonitic material.

The lower portion of the uppermost pay streak in the wells was shot, leaving a fairly large cavity. This pay streak supplies only a portion of the production and the oil from the lower zones must be obtained if maximum production is to be gained. The exposed unproductive formations have a tendency to cave and fill the space between the hole and the tubing, bridging it and shutting off part of the pay zones. The wells were produced with the standing valve immediately above bottom of the hole but the cavings fortunately did not freeze the tubing. However, the bridge was sufficiently tight to keep the wells from obtaining the maximum production.

Cleaning Out

The first step in reconditioning is to pull the tubing and lifting equipment from the wells and clean them out to bottom. The wells are also swabbed to pull any loose material into the hole where it can be bailed or sand-pumped out. If the hole doesn't cave too badly this part of the operation takes 3 or 4 days.

After the hole is clean, the gravel is poured into the hole in 20-gal. increments. After each batch is trickled in, the tools are run to bottom to gage the fill-up. This process is repeated until the hole has been filled to about 15 ft. above the top of the shot cavity (Fig. 1). The approximate size of the shot hole can be obtained by measuring the fill-up from each batch of gravel.

The pea gravel used for this purpose consists of material not larger than ½ in. and not smaller than ¼ in. Its cost is approximately $6 per yard and the largest quantity used to load a hole to date is around 650 gal. About 18 hours is required to place the gravel.

After the gravel has been placed, the tubing and production equipment are run back in the hole and opera-

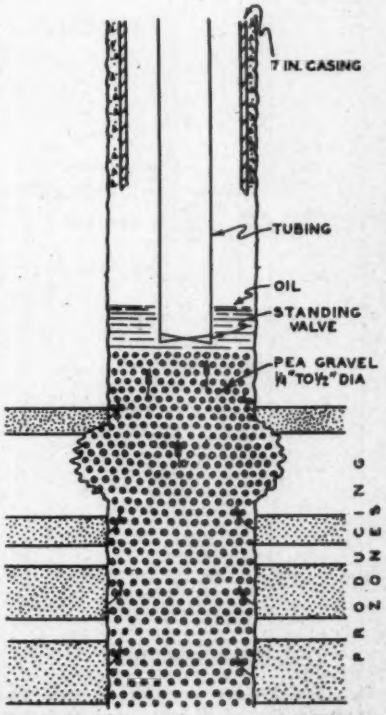


Fig. 1—Schematic drawing of gravel loading of exposed formation to prevent caving and bridging

tions started. The standing valve is, of course, located immediately above the top of the gravel instead of opposite the lowermost pay streak. Oil can get into the well bore and the formation pressure is sufficient to keep it standing above the top of the gravel pack where the lifting equipment can pick it up.

During the workover period there is an accumulation of oil in the hole which has to be produced and the result of the reconditioning is not estimated until the production has settled down. On one well, which made 18 bbl. per day before loading with gravel, the production several months after the job was done was 40 bbl. daily. Another 18 bbl. per day well was increased to 28 bbl. and one making 14 bbl. per day was brought up to 22 bbl. daily. So far the method has not failed to result in a substantial production increase which is being maintained.

Extended-Type Packer Used

The same method was used on a well with an exposed gas zone from which gas was obtained for gas-lifting five other wells in addition to the particular well (Fig. 2). The gas zone was above the three oil-producing zones in the well. A shot cavity was also present below the gas zone.

An extended-type packer with the slips set in the casing and the rubber packing element set below the gas zone and above the oil zones was used. When this packer is set, it permits the gas to be produced through the annular space between the casing and the 2½-in. tubing for use on the other five wells as well as in the well itself. A macaroni string of 1¼-in. tubing is used inside the 2½-in. tubing to provide the eductor tube and the annular space for the operation of the gas lift used in lifting the oil production from the lower formations.

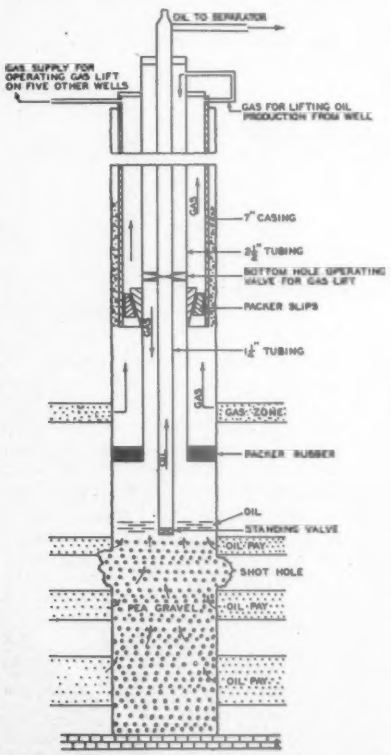


Fig. 2—Schematic drawing of well with gravel loading of oil zones, and production being gas-lifted by gas from upper zone. Upper zone also provides gas for operation of five other gas-lift wells

The system would have worked well enough (as far as obtaining a gas supply was concerned) with the production being lifted off bottom except for the fact it had been demonstrated that maximum oil production could not be obtained. Filling the well with gravel to 15 ft. above the shot hole allowed more production to be obtained than was formerly produced before making the combination installation. The well has been in operation for nearly 3 months and so far has functioned satisfactorily without any trouble.

Tank Fires Caused by Bacteria

ON December 3, 1942, The Oil and Gas Journal published an article by Capt. J. D. McCamey on Methods of Combating Fires in Oil-Storage Tanks. A letter from D. van N. Schonegevel attributing some fires to self-ignition of ferro sulfide was published in the Journal in the issue of February 4 of this year. A reader in England has sent in another interesting contribution to this discussion in which he shows how the sulfide, identified as "pyrophoric iron sulfide," is formed. His letter follows:

"There are certain bacteria which can exist only in water free from oxygen and not exposed to light; these are the so-called anaerobic bacteria. Spirillum desulfuricans belongs to this genus, is capable of reducing sulfates to hydrogen sulfide, and requires the following conditions:

1. Water with a total absence of air (oxygen).
2. Total absence of light.
3. Presence of assimilable organic compounds.
4. Presence of sulfate(s).

"As the sulfate-reducing spirella are present in practically every soil, their introduction into a tank is more or less a certainty. The conditions in the tank are ideal for the existence of these anaerobic microbes, being in darkness, while the water at the bottom of the tank is sealed off from the air by the crude oil or product. Any oxygen which may have been in solution in the water on entering the tank is quickly absorbed by the steel tank shell and the aerobic bacteria in the water and sludge. Oil-well waters invariably contain sulfates, so that in crude-oil tanks the conditions for the continued existence of spirillum desulfuricans are assured. Although the first three conditions are invariably fulfilled in all tanks it is possible that the water settling out in some of the product tanks are deficient in sulfates, and so would not be ideal for the anaerobic microbes.

"Laboratory experiments have shown that in the corrosion of iron through the medium of sulfate-reducing bacteria, the ratio of the total corroded iron to the iron in the iron sulfide is invariably greater than 1, and varies from 2.4 to 1 to 3.4 to 1.

"The entire electro-biochemical iron corrosion process would seem to be represented by the following equations:

$8H_2O \rightarrow 8H^+ + 8(OH)^1$

$4Fe + 8H^+ \rightarrow 4Fe^{++} + 8H$ Anodic solution of iron

$H_2SO_4 + 8H \rightarrow H_2S + 4H_2O$ Depolarization

$Fe^{++} + H_2S \rightarrow FeS + 2H^+$ Corrosion products

$3Fe + 6(OH)^1 \rightarrow 3Fe(OH)_2$

This leads to the following equation:

$$4Fe + H_2SO_4 + 2H_2O \rightarrow 3Fe(OH)_2 + FeS \quad (1)$$

and the ratio of the total corroded iron to the iron from the iron sulfide would be 4 to 1.

"The differences between the theoretical ratio and those found experimentally are ascribed to the fact that during the sulfate-reduction process, in addition to oxidation of the cathodic hydrogen, the hydrogen from the organic food has also to be oxidized, when hydrogen sulfide is liberated as a dissimilation product from the sulfate a greater quantity of iron sulfide is thus formed than that given by formula (1).

"The iron sulfide so formed is very finely divided and in this condition it is known as pyrophoric iron sulfide, on account of its liability to spontaneous combustion on contact with air.

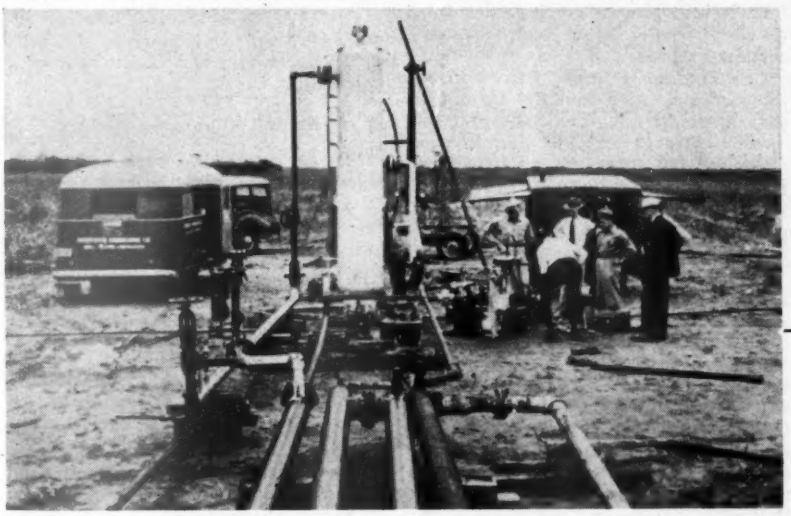
"The formation of pyrophoric iron sulfide at the bottom of oil-storage tanks would appear to be preventable by making the conditions so that the anaerobic sulfate-reducing bacteria are unable to exist, say by changing the water at the bottom of the tanks once a fortnight. This was found sufficient in the U. S. Navy for the fire lines on warships with which trouble was experienced on account of excessive corrosion."

Standardization of Gas Testing

by Neil Williams

DEVELOPMENT of standard methods for sampling and testing and for determination of specific gravity of high-pressure two-phase gases continues to receive major consideration of the technical committee of the High Pressure Gas Division of the Natural Gasoline Association of America. An apparatus now is being perfected which the committee hopes may be used under all conditions as a standard for determining specific gravity but so far as a standard for sampling and testing is concerned it is felt that much work remains to be done before objectives can be realized.

The progress being made in developing a standard for sampling and testing two-phase gases is indicated in the results of the most recent field tests sponsored by the High Pressure Gas Division of the Natural Gasoline Association of America. An account of these tests is reported in this article.

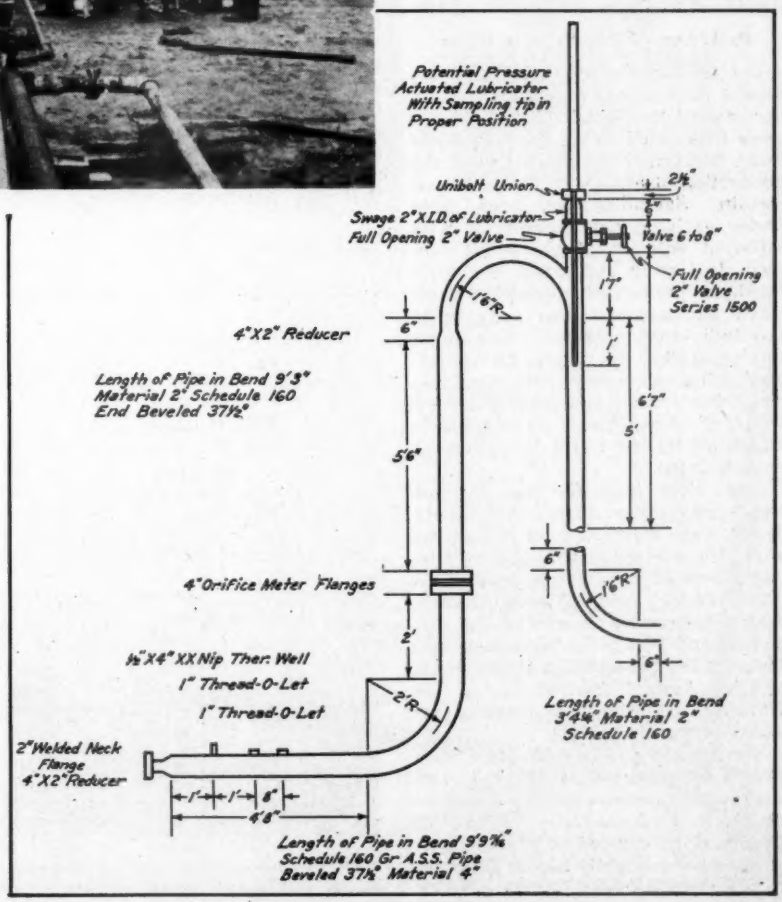


Above: Exchanger and separator hookup. Right: Piping arrangement for gas sampling tests

This work represents two phases of the special research program dealing with various problems pertaining to distillate operations that the committee undertook a little more than a year ago. Five other phases were embraced in the program, one of which already has been concluded with the recent adoption of a standard method for high-pressure gas measurement.[1] The others include studies of high-pressure gas transmission, subsurface flow conditions, liquid entrainment in high-pressure gas streams and the development of methods for removing salt and hydrogen from gases. Extensive research into the latter four problems has been delayed pending development of standard methods for sampling and testing gases and for high-pressure gas measurement.

Efforts to develop a standard method for sampling and testing gases have called for a continuation of field tests with the different widely used small-scale gas-distillate sampling devices. In these, results obtained by the sundry devices when testing the same gas from the same well under identical conditions are compared with the results obtained by full-scale separation of a well's production in a high-pressure separator. Carried on in several areas, all on the Gulf Coast, on gases of varying liquid content and different pressures, the tests permit a check of the devices under a range of conditions.

Full-scale separation involving measurement of the entire production



[1]Proceedings of Twenty-first Annual Convention of the Natural Gasoline Association for 1942, pp. 41-58.

Line sampler installation with gravity tester (right)

of a distillate well is the standard of accuracy for calibration of results of the small-scale sampling devices. As a regular method of testing wells, however, it entails considerable expense both in extra facilities required and in operating personnel and time, and is not always convenient. Consequently, it generally is desirable to evaluate the production of a well on the basis of tests of relatively small samples of production obtained by means of the various sampling devices. Most of these consist of tube arrangements inserted into the flow stream at the well head or at a point where well-head conditions exist.

Problems of Small-Scale Tests

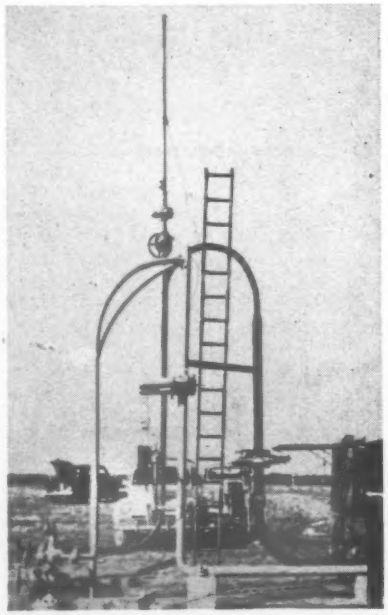
Use of small-scale sampling and testing devices has presented a number of complications in that there has been little uniformity in determinations, making true evaluations of the production of a gas-distillate well uncertain. Sampling has been done under variable well conditions with different volumes of gas being handled. In testing, separation of liquids has been performed at varying pressures and temperatures suitable to the individual operator. Sometimes the separated gas might be considered; other times not. For this reason it was deemed advisable that some standard of conditions be adopted to which all testing could be calibrated or correlated.

First field tests for this purpose were undertaken during April 1942. These were conducted on a distillate well (No. 9 Wardner) owned by Chicago Corp. in the Stratton area of the Agua Dulce field, Nueces County, South Texas. An account of the procedure and results in these tests was given in the Proceedings of the Twenty-first Annual Convention of the Natural Gasoline Association of America for 1942.

The latest series of tests were made over a 4-day period on a well (1 Luling Foundation) owned by Lockhart Oil Co. in the Agua Dulce field proper. The gasoline content of the gas from this well was slightly higher than that in the former wells. Profiting by experiences in the first tests, a number of changes were made in procedure followed in the latest test designed to simplify the work and eliminate certain hazards.

One of these changes was to insert the sampling tube into the tubing so that it would not extend beyond the master gate. It was felt that in case of emergency it might be necessary to shut the well in rapidly, and, if the sampling tube extended below the master gate, delay would arise in the time required for its removal.

Another departure from previous procedure was the use of gallons of separator fluid instead of stock liquid plus the recoverable liquid in the separator and stock-tank gases for comparing full-scale and small-scale results. The particular advantage of this procedure, it was explained, was that it eliminates a number of charcoal determinations, thus expediting results. The main disadvantage was that the gallons-per-minute figures between runs were not comparable since separator conditions varied. A report of the technical committee gives the following account of the tests:



Well hook-up showing vertical sampling section with sample nozzle attached

"Piping arrangement on the Lockhart well for the tests is shown in an accompanying drawing. The sampling section was connected to the tubing wing through an adjustable choke. The opening for insertion of the sampling tip was at the end of a vertical straight section so the tip could be centered in the flow stream. On the other side of the loop the orifice flanges and meter were installed in the vertical section. Just ahead of the exchanger where the well stream was cooled with separator gas a line sampler was put in the system with a bypass so it could be cut out when not in use. Adjustable chokes were installed at the well head, at the inlet to the exchanger and on the separator vent line.

Results of Sampling Tests

"In all tests, the separator pressure was maintained at approximately 1,000 lb. In one series of tests the well stream was choked at the entrance to the sampling section so that the fluid passing the sampling point contained large amounts of fluid. In all these cases, the operators of small-scale equipment complained of erratic results in their equipment, indicating that slugs of liquid were being withdrawn at the sampling point. Several small-scale results were not reported because of this since the operators could not get consistent points from which to draw a curve of separator liquid versus temperature at separator pressure. The point corresponding to full-scale conditions is taken from this curve.

"This irregularity in the sample stream fed to the small-scale equipment was not reflected in the rate at which liquid accumulated in the full-scale equipment. The average deviation in the time required to build up 22 gal. of liquid in the separator, varied from a low of 0.04 per cent to a high of 0.8 per cent, or practically speaking, the rate was constant in all runs.

"In the second series of tests samples were obtained with higher pressures at the sampling point and no complaints were made about irregularities obtained above.

"In both series of tests the velocity at the sampling point was approximately the same. In view of the trouble encountered when liquid was present in relatively larger amounts, the first series was expected to be more erratic than the second. Remembering that some results in the first series were not reported this was correct. However, for these results which were reported, there is little choice between the two series."

NO. 6 OF A SERIES

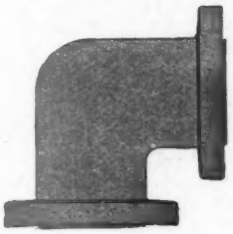
HOW TUBE-TURN WELDING FITTINGS BENEFIT WAR INDUSTRY

★ The ★ FIRST WELDING FITTINGS 1ST AND STILL THE BEST

Weight saved* with Tube-Turn Welding Fittings aids war industry—by economizing steel, speeding pipe erection, conserving supports, reducing shipping weight.

**Tube-Turn fittings in comparison below are 6", Schedule 80. Other fittings are 6", 600 lb. class.*

FORGED FLANGED ELBOW



450 lbs.

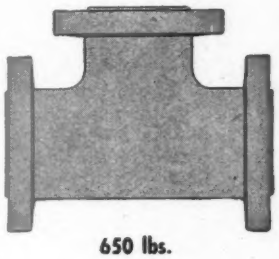
CAST STEEL FLANGED ELBOW

250 lbs.

TUBE-TURN WELDING ELBOW

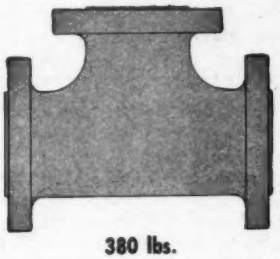
33½ lbs.

FORGED FLANGED TEE



650 lbs.

CAST STEEL FLANGED TEE



380 lbs.

TUBE-TURN WELDING TEE

80 lbs.

THE examples illustrated above demonstrate the tremendous differences in weight between Tube-Turn welding fittings and other types of steel fittings. These comparisons are for 6" size (see note above), and other sizes are more or less proportionate.

Weight saving *always* has been an important reason for specifying Tube-Turn welding fittings. But today's war production needs stress additional advantages of this feature. It saves steel—because less of this strategic metal is required in making Tube-Turn fittings. Piping systems welded with Tube-Turn fittings are *lighter* and *streamlined*—which speeds erection, saves space, and simplifies structural problems. Remember these timely points when you buy or specify fittings for oil, gas, power, chemical, heating, air, refrigeration and marine piping today!

OTHER WAYS TUBE-TURN FITTINGS HELP WAR PRODUCTION:

SPEED INSTALLATION: Less time needed for aligning thanks to true circularity and uniform walls. Only simple butt welds required, easy even for novice welders. Whole section can be pre-assembled on the ground.

SAVES SPACE: Tube-Turn fittings permit streamlined, compact layouts and sharp angles—neater, more efficient piping.

REDUCES MAINTENANCE: No gaskets to replace, no nuts or bolts to tighten. Maintenance practically eliminated. Relieves men for other duties.

AVOID SHUT-DOWNS: Practically no danger of shut-downs due to connection failures as welding with Tube-Turn fittings *eliminates* the chances of leakage.

INCREASE SAFETY: Exclusive manufacturing process gives greatest possible strength in fittings, full freedom from leakage, and longer life in piping systems.

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TRADE MARK

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Some Batching Practices Used by Pipe Lines

by Paul Reed

For eliminating factors inducing contamination and for increasing operating efficiency a number of practices for batching crude oil and refined products through pipe lines have been developed including new applications of control equipment, effective design of piping and installation of valves, regulation of flow through a looped line, new utilization of instruments and the "carrying ahead" method for increasing capacity of a line batching tenders of different viscosities.

BOTH crude oil and refined products pipe-line organizations are concerned this year with methods for the efficient batching of tenders through single lines. Adjustments in pipe-line transportation to the East Coast require that all mediums for petroleum transportation toward that area be operated for long periods at full capacity.

Some of the recent improvements in pipe-line methods have not only effectively reduced contamination between batches but they have also facilitated satisfactory movement of batches through a looped line and have provided operating procedures which insure high capacity operation while moving fluids of different viscosities.

Various methods for separating different shipments or tenders of fluids passing through a line, including water slugs, "blue flags" of colored gasoline and synthetic-rubber plugs have been employed. These methods are still used to some extent but the principal reliance is put on the effect from "packing" the line. This effect of pressure in maintaining desirable contact conditions between tenders has sometimes been referred to as one which occurs when flow is turbulent rather than streamline. But it has been emphasized that sufficient pressure is the important factor; if this is maintained movement through the line can be stopped completely without changing the relation of two fluids at the point where they meet.

Controls and Connections

In the initial operation of certain refined products lines traversing mountainous country, contamination troubles occurred due to what has been referred to as the "sewer pipe effect"; sewer pipes are normally only partly full. This effect is found when pumps at the foot of a slope are operating at too fast a rate. As a result, at the point where the line crosses high ground, the character of the flow changes from turbulent to streamline due to the damming effect produced in the overbend of the pipe there. To insure high enough pressure at the suction end of the line, automatic controls have been installed extensively at products pipe-line stations to prevent overspeeding of pumps.

Experience with batching through pipe lines has taught the importance of designing the piping so as to eliminate pockets which hold fluid from one batch which contaminates the one which follows. Some systems, designed originally for handling one fluid, and later utilized for batching fluids with marked differences in characteristics, have had to be revamped; valves have been reinstalled closer to the main line and some pockets have been completely blanked off to render them harmless.

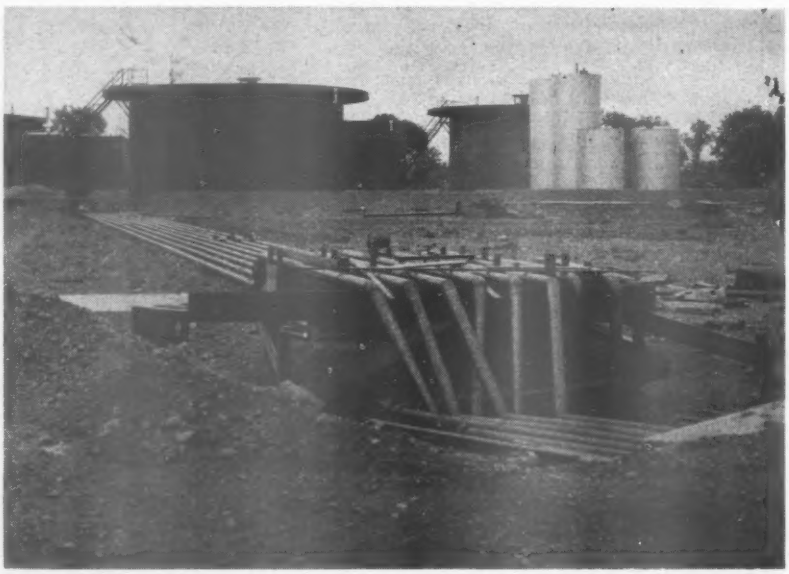
Because there has been much trouble with batching through a looped line some companies have filled in the intervals between loops so as to have parallel continuous lines for segregating movements which will obviate the need of batching.

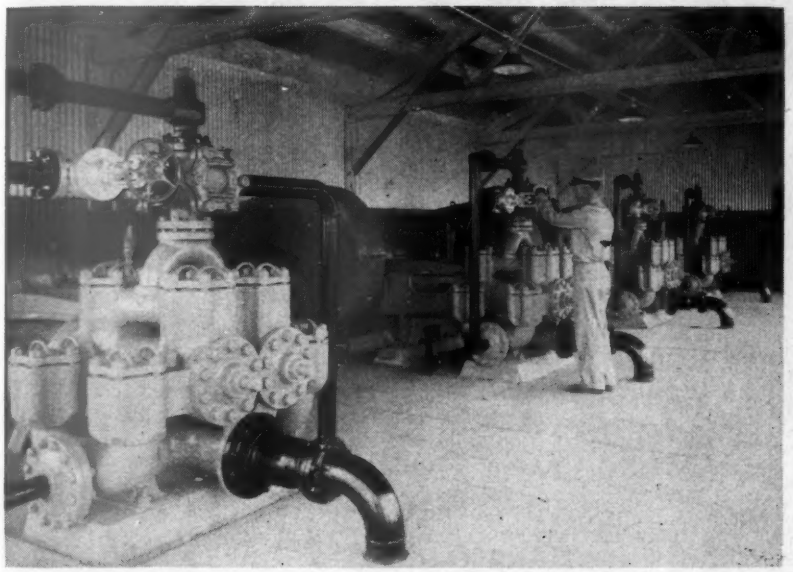
Flow Through Loops

However, one of the oldest major refined products systems provided additional capacity by extensive looping of its trunk line last year. It was anticipated that flow through the loop would be faster than through the old line because the loop has new pipe of slightly larger diameter. Protection against contamination was provided by a method of flow control which involved the installation of flow-nozzle meters on each of the lines near the connection at the high-pressure end. The first intention was to have the flow nozzles connected so as to actuate a diaphragm control valve which would equalize the rate of flow through the two lines. After the loops were put into service, it was found that satisfactory regulation of flow could be obtained by manual manipulation of a valve. Automatic control is not employed. Attention to flow conditions on the part of station operators is not necessary more frequently than once every 24 hours.

For determining the precise moment when the contact point of two batches reaches a pump station or a terminal a number of devices are used. Standard practice has been for a station operator to take gravity readings with

Eight parallel lines for running separate refined products from a trunk line to terminal tanks





Wartime installation of reciprocating pumps of rotary drilling, mud-hog type for moving shipments of refined products from Pan American Refining Corp. to pipe-line systems

a hydrometer at the station manifold where samples are drawn from the line at frequent intervals, just before and after the incoming tender is expected to arrive. Within the last year wide use of a new type of gravity meter has been used at terminals of both crude and products lines; hydrometer readings continue to be taken at pump stations of refined products lines. The gravity meter has proved its value on both types of lines.

Instruments

Some experimental work is reported to be done with a flash-test method for accurate spotting of the contact point between heating oil and lighter products. It is said that such tests are made with apparatus of a type employed for detecting explosive mixtures in tanks.

Plans discussed for operation of War Emergency Pipelines, Inc., 20-in. Texas-New York refined products line are reported to call for a schedule of shipments which, over a period of time, will have a daily average of 129,000 bbl. of motor gasoline, 41,000 bbl. of 100-octane gasoline and 30,000 bbl. of special 87-octane gasoline; these will total 200,000 bbl. daily. It is said that tenders will be separated by slugs of gasoline tops or overleaded alkylate. To adequately provide for batching, tankage with capacity of 1,750,000 bbl. will be built at the southern end of the line.

Engineers have devised a method for maintaining a high rate of flow for use on the Ajax Pipe Line Corp. trunk line while moving batches of crude oils of different viscosities. By the application of this procedure, it is possible to attain a capacity of 5,000 bbl. per day greater than that obtained with conventional practices. This method, known as "carrying ahead," cannot be described in detail at present. At some later date, when it is appropriate, an article presenting the details may be published. In the meantime, some of the main features currently familiar to pipe-line men can be briefly outlined.

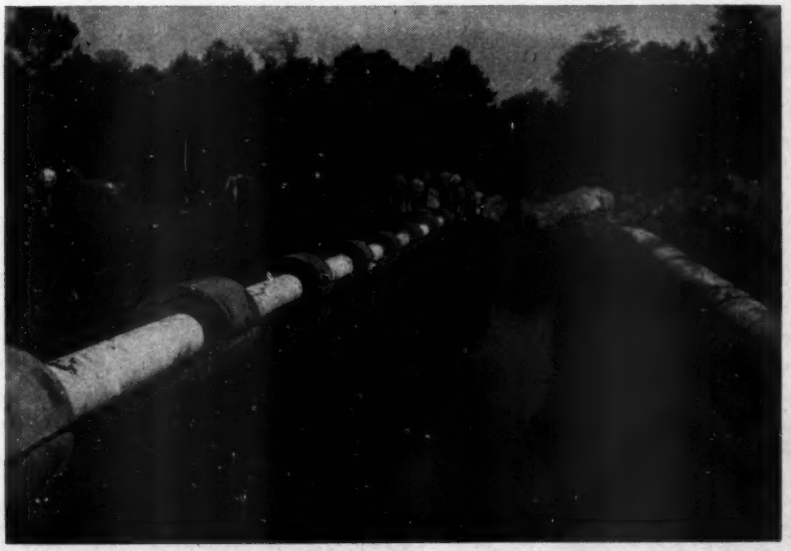
The Ajax trunk line consists of nearly 400 miles of two parallel 10-in. lines between Jenks, Okla., and the Wood River, Ill., terminal of the Ohio Oil Co. pipe-line system. There is no attempt to use the two lines for segregating shipments; both lines are operated together like a single line. At each of the eight stations there is a 30,000-bbl. tank for floating storage. An exception is the Pryor, Okla., station with two additional tanks of the same size used for measuring and receiving.

"Carrying Ahead"

Three mixtures of crude are batched through the line. To avoid letting a tender of most viscous batch retard movement of batches of the other two mixtures, a "carrying ahead" method provides for pumping the maximum amount of crude at the highest pressure practicable for the line. In 1943, with careful planning, it is anticipated that average deliveries will approximate 120 per cent of the volume of throughput originally regarded as possible.

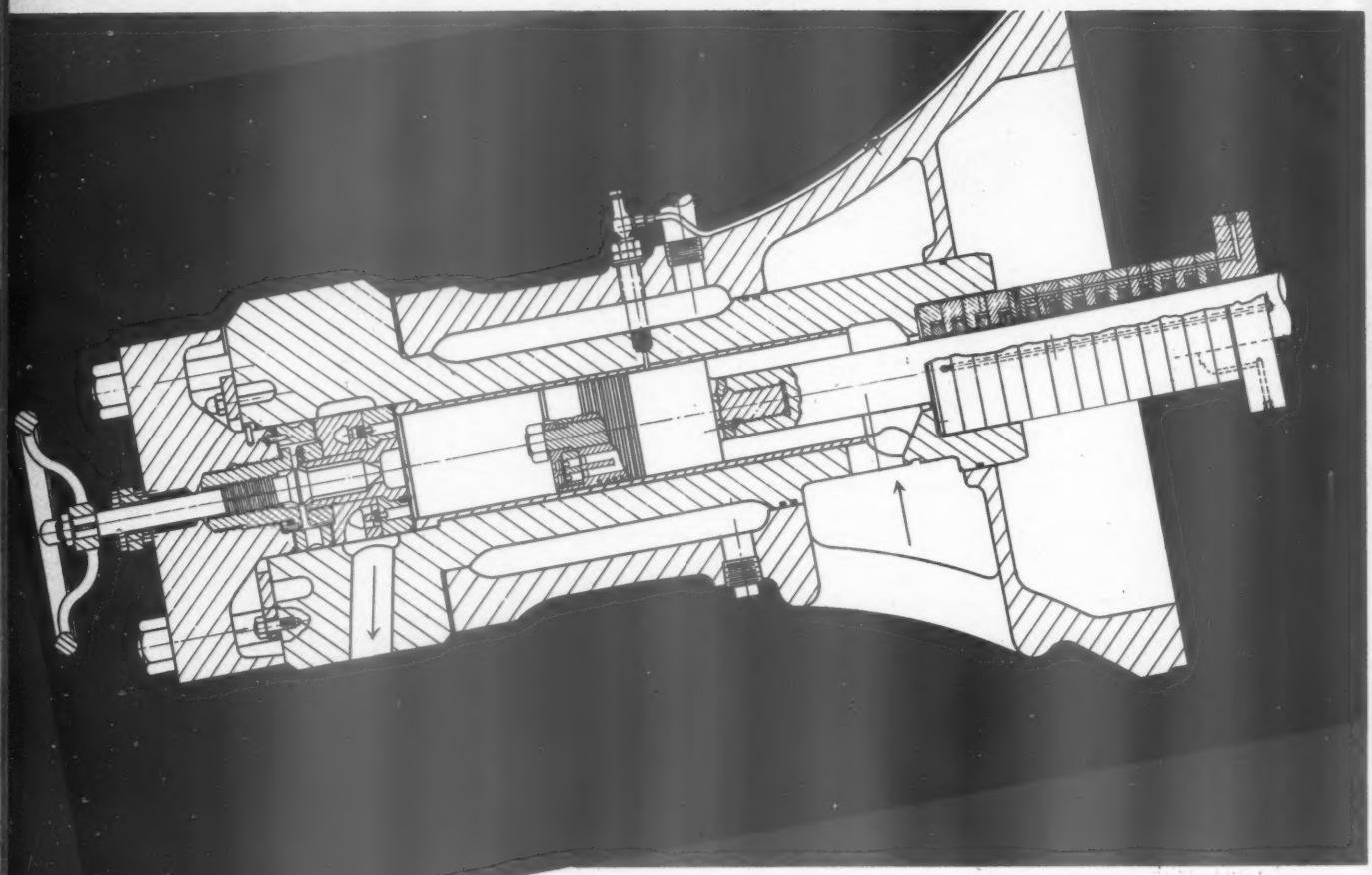
When the faster moving Texas crude batch is pumped behind the slower moving Mid-Continent crude, excess crude from the Texas crude batch is allowed to run into stock tanks at each of the stations. Later each station successively draws from this excess stock. This is necessary in order to maintain the high delivery rate set by the head station pumping the Texas crude batch, while, at the same time, the next batch of slower moving crude is reducing pumping velocity. By this method, it is possible to maintain pressure almost constantly.

The wider range of refined products being batched through pipe lines, the need for higher capacity of all lines moving batch shipments and the interesting problems arising in the batching of tenders through the WEP lines indicate that some new developments should be expected as a result of the close attention given to this phase of pipe-line operations.



For part of the Lirette-Mobile natural-gas line, V. E. Hamilton, construction superintendent, used 750-lb. concrete clamps of a type developed by him for company lines

"KNOW HOW"



(1) Straight flow . . . less pressure loss . . . higher efficiency!

(2) Relatively large valve areas, averaging better than 14% of the effective piston area, with lowest possible normal clearance.

(3) Wide range of adjustability of clearance to meet varying demands.

(4) Cylindrical, forged steel barrel with durable Meehanite liner. Longer life!

(5) Stronger pressure end . . . because absence of suction valves means fewer transverse holes.

(6) Extreme accessibility of valves! Removing one cover exposes both valves without disturbing high pressure piping.

(7) Fewer number of gasketed joints in high pressure end. Less maintenance.

(8) Rod packing not exposed to discharge pressure.

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Practical Refining Series—Part 8

Getting the Most Out of A Fractionating Tower

by W. L. Nelson

MAKESHIFT fractionation equipment has become a necessity by the shortages of war. Oversize equipment causes no great difficulty, at the worst necessitating only the removal of some caps and the plugging of the vapor uptakes to the caps that are removed. In this connection, it might also be mentioned that a better job of fractionation can be done in an oversize tower by the use of a higher feed temperature (or more reboiler heat) with a correspondingly larger amount of reflux providing, of course, that auxiliary heating and cooling equipment is adequate for a larger heat-input and reflux ratio.

Boosting the capacity of a tower to a larger capacity than that for which it was designed is a more difficult problem. In most instances, as will be shown later, increasing the capacity of a tower involves using the tower in a new or different way rather than by mechanical adjustments by which higher velocities of flow can be accomplished. Obviously, mechanical changes or adjustments can be made in poorly designed towers but unfit towers are relatively rare and hence in most instances recourse must be had to changes in the fundamental processing by which the quantity of material to be handled in the tower can be decreased.

Throughout the entire discussion which follows, it must be kept clearly in mind that changes in the tower operation may necessitate changes in other operations such as reflux cooling, side-reflux cooling, temperatures of streams to the cooling boxes, possibly increased feed temperatures, etc. These changes are reflected so far into the adjacent processing that all of them cannot be discussed here, it being necessary to consider each situation separately in the light of its particular processing environment.

1. Operate at a maximum pressure. The capacity of a fractionating tower is somewhat larger at high pressures than at low pressures. This may be illustrated by the capacity of a tower 6 ft. in diameter which is used for topping gasoline, kerosene, and distillate (1,100,000 B.t.u./hr. reflux heat per 1,000 bbl./day).

Operating pressure (gage)	Capacity, bbl./day	Per cent Increase
0	3,780	0
20	5,750	52
50	7,660	102

In high-pressure towers it is often necessary to enlarge the downspouts. Our knowledge of the effect of pressure on capacity is not very complete and hence it is doubted if the effect of pressure is quite as much as shown.

2. Produce a minimum overhead product.—This saving in tower capacity revolves upon the fact that the overhead product is not condensed in the tower whereas side-draw products must be condensed in the tower. Although the reflux-heat duty of the tower examined in item (1) above is increased as the overhead product (gasoline) is reduced from 30 to 20 and 10 per cent by making side-draw naphtha or heavy gasoline cuts, the amount of vapors that must be handled at the top of the tower is greatly decreased. The effect is not as important as the effect of pressure but it is worthy of attention. For a 20-lb. pressure, the tower capacity is increased as follows:

Per cent overhead product—	Capacity, bbl./day	Per cent increase
30	5,750	0
20 (10 per cent naphtha)	6,100	6
10 (20 per cent motor base)	6,880	20

3. Utilize side reflux.—The largest volume of vapor in a tower is normally at the top of the tower, decreasing to a minimum at the feed or vaporizer plate. By using reflux for cooling the center of the tower, it becomes unnecessary for reflux vapor to travel to the top of the tower to be condensed, and thereby the duty at the top of the tower is decreased. The use of side reflux must be governed by computations because to remove too much heat by side reflux will completely upset the normal operation of the tower.

On this page is shown a fractionating tower with side-reflux connections or auxiliaries. This tower system was computed in three ways, (1) using only top reflux, (2) using top and side reflux 1 in the optimum proportions and (3) using top and side reflux 2 (only) in the optimum proportions.

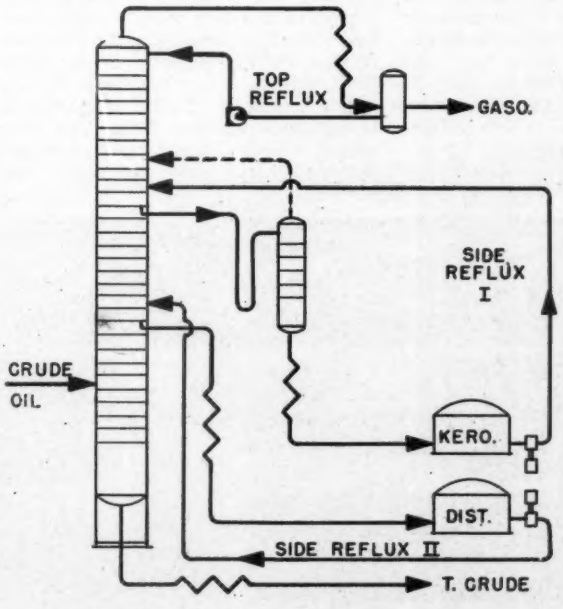
The capacity of the tower in these manners of operation are somewhat as shown in this tabulation. This is the same situation as in items (1) and (2) above when operating at 20-lb. gage pressure.

	Capacity, bbl./day	Per cent increase
Top reflux	5,750	0
Top reflux and kerosene side reflux	6,000	4
Top reflux and distillate side reflux	6,550	14

This method of increasing the capacity of a tower is more effective than indicated in the tabulation if deeper topping is done in the tower (also produce gas oil) or if the lower temperatures are higher because of a high-boiling crude oil.

The amount of side reflux that can be employed is usually somewhat small, and to use too much side reflux may result in no increase in capacity. The amount can be determined only by computations on the particular tower and its charge stock.

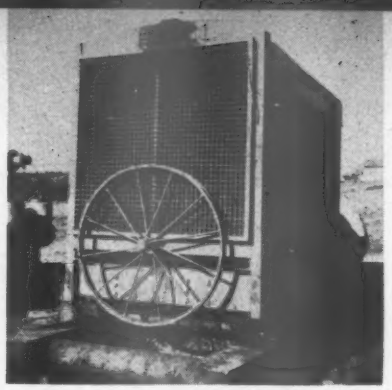
It must be pointed out that the use of side reflux causes somewhat less effective fractionation of the products that are produced above the side-reflux connection but the inefficiency of fractionation is usually of little importance and cannot always be noted.



OPERATING IDEAS

Pipe-Threading Device Powered by Truck Rear Wheel

A PIPE-THREADING device using ordinary stock and dies that can be powered by a truck in the field can be made easily in most any oil-company machine shop. The one shown is made out of old brake-band steel fashioned into the form of a box with both ends open, and having holes drilled to fit the rear wheel of a truck. The yoke that turns the threader is made out of heavy strap iron and is bolted to the base. By removing the yoke, inserting a wrist pin in the hole shown in the lower corner of the box and using a pitman, the device can be used to run a low-down pump ("one-arm Jonny") for cleaning tank bottoms, etc. (Suggested by Alvin Wise, Ohio Oil Co., Webb City, Okla.)

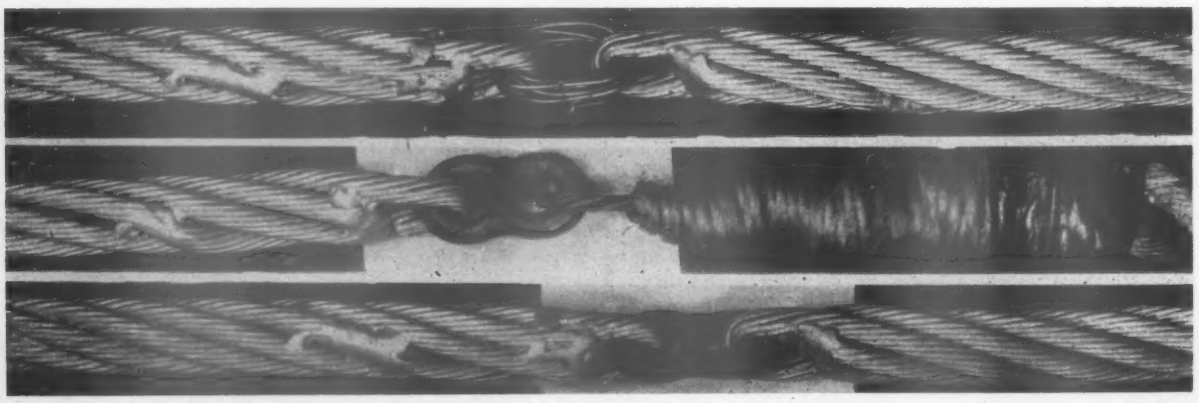


Rope Starter for Large Multicylinder Engine

TROUBLE often is experienced in starting large multicylinder engines around drilling rigs or pumping installations, particularly in cold weather. To facilitate this operation, one operator has provided a rope starter utilizing a wheel from a cultivator to turn over the engine. The wheel replaces the rope sheave used on some large engines or the hand crank on smaller installations. The wheel is notched in one place for engaging the starter rope knot. The starter rope in this case is about 25 to 30 ft. long and consists of soft laid cable about ¼ in. in diameter. On one end is a piece of hemp rope 5 to 6 ft. long to prevent injury to the operator's hand in case the engine backfires. Two or three men originally can start a 125-hp. engine unless it is stiff after a shop overhaul job, in which case an automobile is used. On a small engine the rope might not be needed, the wheel being turned by hand.

Wire-Line Threading Eye For Stringing Up

A WIRE-LINE threading eye that can be used on any wire line in stringing up, and which is especially advantageous in stringing up and running on new rotary lines, has been originated and employed by Earl E. Wherry, retired drilling contractor, Oklahoma City, Okla. Three different applications are shown in the accompanying picture, one employing ordinary bailing wire for typing the ends of two lines, and two employing a commercial eye connection. The center picture shows how the eye is used with the catline for pulling a line over the blocks. The eye is made a part of the line with a little work by the welder. First, about 6 in. is cut off of all the strands except one. Next, one of the cut strands on the opposite side from the long strand is cut back another 6 in. The long strand is heated and turned back and the end fitted into the space left after cutting the short strand, forming an eye at the end of the line. The turned end is held in place by a few spot welds. Also the ends of the cut strands are spot-welded to prevent unraveling. The outside diameter of the finished eye end of the line is no greater than the line itself, permitting it to be run freely through the blocks without removing any guards or wire-line guides. The eye is more flexible than the babbitted end on a rotary line, is inexpensive and saves much time in stringing up.



To all Visco Employees*

Visco has an important job to do to help win this war. We have to be sure each and every customer is receiving the best possible efficient service which means the driest possible oil at the lowest possible cost. A dry oil reduces the amount of shipping facilities necessary and a lower cost ultimately will be an economy to the Government. This economy may be small, but multiplied by millions, it will produce its ultimate benefit. Visco - the Modern Emulsion Breaker - will not be found wanting in its important task.

Sincerely yours,

F. H. Thorne

F. H. Thorne
President

*excerpt from a general letter to all Visco employees.

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Unitized Pressure Maintenance, Jones Sand Reservoir, Shuler Field, Arkansas

*by George R. Elliott**

Pressure-maintenance operations affecting the Jones sand, Shuler field, Arkansas, have been under way approximately 2 years. In this time 90 per cent of the produced-gas volume has been returned to the producing horizon. Estimates of ultimate recovery have been increased. As a result, more than 20,000,000 bbl. of additional oil is expected to be recovered although half the primary production already had been obtained before start of the project.

EARLY in the history of the development some of the operators recognized the importance of unitizing the Jones sand, but efforts were unsuccessful until state legislation enabled the Arkansas Oil and Gas Commission to issue an order February 4, 1941. At that time the operators presented to the commission a unit operation agreement which included all but one operator; also a royalty pooling agreement, executed by more than 185 persons who owned more than 75 per cent of all the royalty.

It was ordered that after 7 a. m., February 15, 1941, the operator of the unitized area might produce all of the oil permitted to be produced from the unitized area, from any well or wells then situated in the unitized area; and it was ordered that such oil should be produced in a manner which would tend to utilize the minimum quantity of free gas or gas in solution. It was ordered that a repressure plant be constructed to effect pressure maintenance in or repressuring of the Jones sand.

The unitization covered the full royalty and working interest in all but six wells of the 146 Jones sand producers. The Lion Oil Refining Co. at El Dorado, Ark., was elected unit operator subject to a Unit Operators Committee representing the 12 owners.

When unitization went into effect, wells with high producing gas-oil ratios were shut in, and the unit allowable was produced from the most efficient wells, about one-third of the total number. In this way the average gas-oil ratio immediately cut from 2,800 to 1,400 cu. ft. per bbl.

The first gas was injected July 1, 1941. Fig. 1 shows the position of the present six input wells in the high structural portion of the field, and also the 32 producing wells as of March 13, 1943.

The six input wells have been returning 26,000,000 cu. ft. of gas per day with an input pressure of approx-

*Phillips Petroleum Co., Bartlesville, Oklahoma. This paper was presented at the Fort Worth meeting of the American Association of Petroleum Geologists and a more detailed discussion will be printed in the Bulletin of the association.

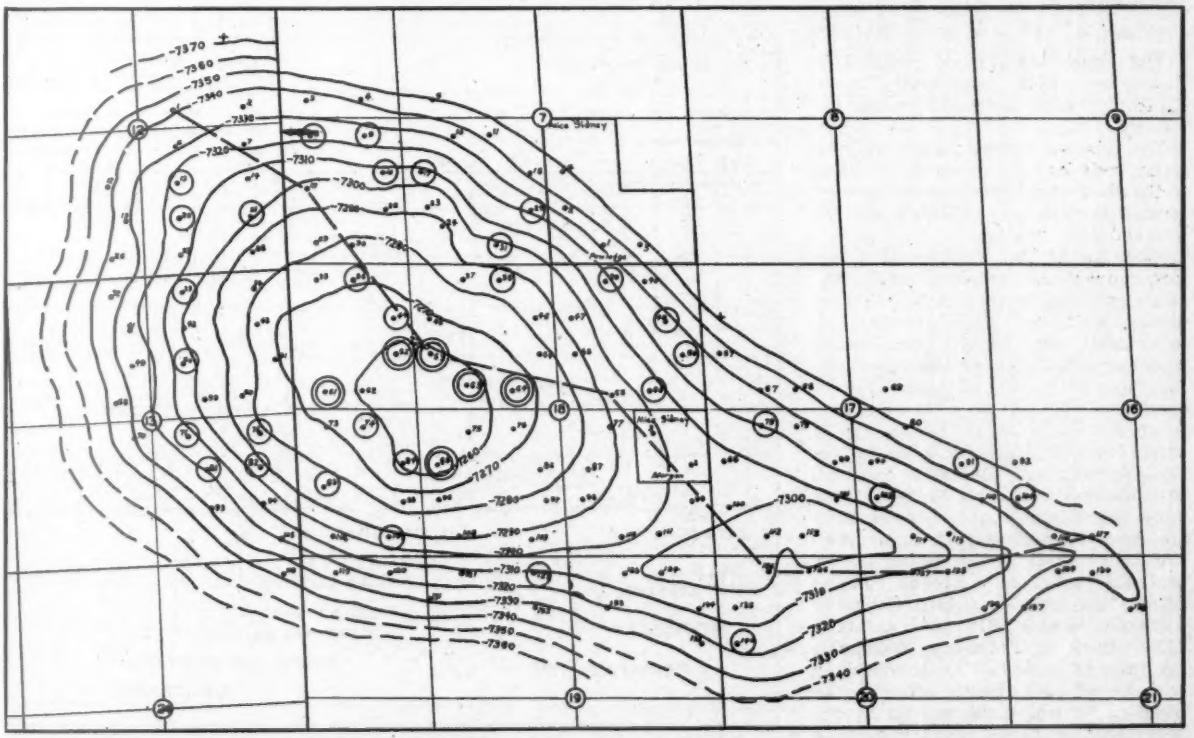

Fig. 1. Structure-contour map of Shuler field. Contours drawn on top Jones sand. Interval 10 ft., showing input and producing wells

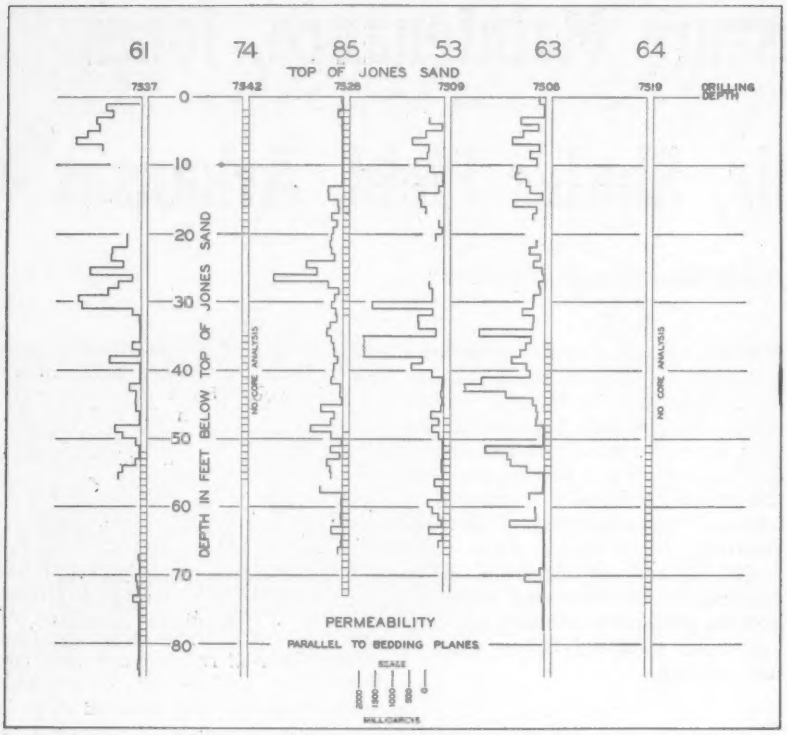

Fig. 2. Permeability cross-section of input wells

imately 1,350 lb. Percentages taken by each input well are shown for 2 recent months, September 1942 and January 1943. These percentages are given in the order of Fig. 2.

Well Number	61	74	85	53	63	64
Sept., 1942, %	20	19	13	15	11	23
Jan., 1943, %	18	23	16	22	8	13

The input wells were acidized in November, 1942; apparently some capacities were increased, some decreased.

The relative volume taken by each input well has no apparent relation to the theoretical capacity of the perforated section as indicated by the permeability profiles.

Evidence of the absence of direct interconnection between wells appears from the history of No. 52, producing well, as related to No. 53, input well, only 660 ft. east. Gas is injected into well 53 through perforations 47 to 67 ft. below top of sand; well 52 produces through perforations 55 to 75 ft. below top of sand. Producing gas-oil ratios for recent months are available for well 52 combined with well 84; both these wells are direct offsets of input wells and have been producing almost continuously since the beginning of the unitized program. Recent gas-oil ratios: 1942, October, 3,447; November 3,479; December, 3,516; 1943, January, 3,639. Back in February 1942 average ratio of these two wells combined with No. 62, also directly offsetting an input well, was 3,180 cu. ft. It appears that in these producing wells, 660 ft. distant from input wells, gas-oil ratio increases at a rate not exceeding the expected average rate of increase for the reservoir.

Unit operation began when pressure had declined from 3,520 lb. to 1,600 lb., and nearly 17,000,000 bbl. or one-half of the estimated 34,000,000 bbl. of primary production had been recovered. While 9,000,000 bbl. of oil have been produced during the unit operation, pressure has declined from 1,609 to 1,469 lb., a decline of only 140 lb. Two years after the average gas-oil ratio was reduced one-half by shutting in wells, the average ratio is still below the 2,800 ratio at which the field was producing before unitization.

The geology of the Shuler field has been ably presented by Weeks and Alexander[1] and need be no more than mentioned here.

The Jones sand is at the base of the Cotton Valley formation, immediately overlying the Reynolds oolite zone of the Smackover formation. Fig. 1 depicts a dome, elongated to the southeast in the form of a terrace, thence narrowing to a point at the east limit of production. The highest Jones sand top was cored at 7,251 ft. subsea in Phillips 3 Marks, NW SW Section 18; the lowest top cored in a productive well was at 7,362 ft. subsea in Phillips 1 Edwards, near the center of Section 17; this represents a productive structural closure of over 111 ft.

Core graph detail. — Fig. 3 is an example of the core graphs which were constructed primarily for the completion of each well, but which have been of great value in calculations of oil-in-place and are of increasing importance in reconditioning

1. Warren B. Weeks and Clyde W. Alexander: "Shuler Field, Union County, Arkansas," A.A.P.G. Bulletin, Vol. 26, No. 9, September, 1942.

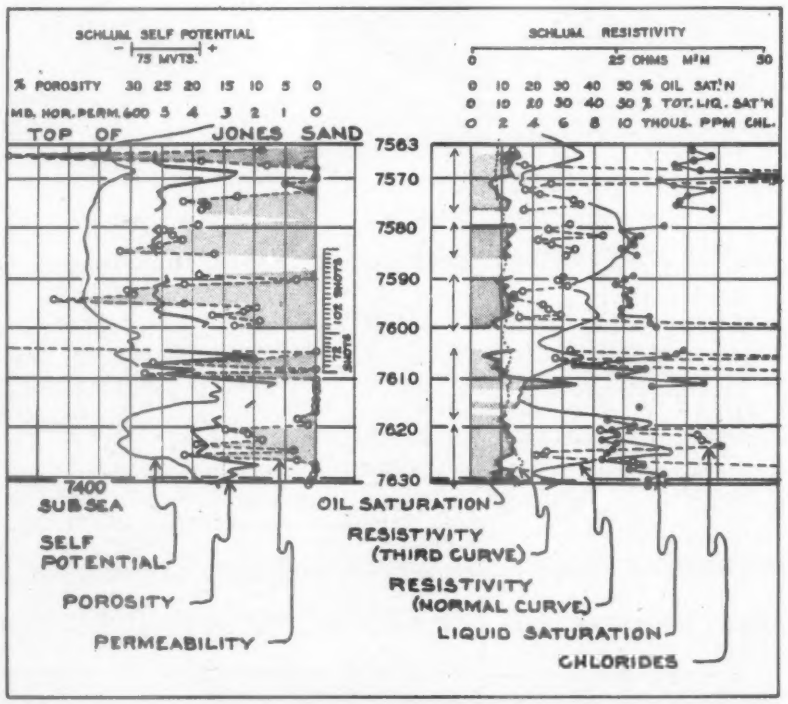

Fig. 3. Core graph of Jones sand, Phillips 2 Amanda

and in pressure maintenance operations. The illustration is a typical core record. Five cores were taken covering from 7,564 to 7,634 ft., an interval of 70 ft. Total recovery was 59.3 ft. Top of Jones sand in this well is 7,323 ft. subsea, 72 ft. below the highest well and 39 ft. above the lowest well in the field.

In addition to the core analysis data, comprising per cent porosity, permeability parallel to bedding, oil saturation, total liquid saturation, chloride content, the graph also includes the corresponding electric log self-potential and resistivity diagrams.

It may be useful to recall: Porosity is a measure of the formation's capacity to contain oil, and represents the summation of all the interstices without regard to size, shape or interconnections; permeability is a measure of the fluid transmitting capacity of the formation, and depends upon interconnected pores resulting from grain size and distribution.

Near the top of the sand at 7,565.4 ft., permeability 993 millidarcys corresponds to porosity 26.1 per cent; at 7,567.3 ft., permeability 161 millidarcys corresponds to 25.9 per cent; at 7,568.5 ft., permeability less than 1 millidarcy corresponds to 13.2 per cent porosity. Thus in 3 ft., while porosity has decreased by one-half, permeability has decreased more than 1,000 times.

In this same 3-ft. interval, because of variation in degree of flushing by the drilling fluid, chloride content increases from 2,560 parts per million to 189,900 parts per million; (chloride content here represents parts of chlorides per million parts of water distilled from the core). Evidence of the absence of flushing is the close agreement of the high chloride content with that of the brine occurring with Jones sand oil production. Average of six analyses is 141,134 parts per million of brine which is equivalent to 182,300 parts per million of distilled water.

The oil saturation ranging from 11 to 15 per cent in the productive sand is not a measure of the oil saturation in the reservoir but represents only the residual oil after a production cycle by gas expansion plus more or less effective water flooding.

The electric log self-potential diagram apparently correlates more closely with porosity than permeability. This would indicate that, of the two causes for this diagram, electro-filtration and electro-osmosis, the latter is predominent; that is, the electromotive force generated by the two electrolytes, the fresh water of the drilling mud and the salt water of the formation.

In the lower part of the graph, a 6-ft. shaly section, 7,611-16 ft., has porosities ranging from 5.4 to 10.9 per cent and permeabilities all less than 1 millidarcy; the 6-ft. sand section just below at 7,620-26 ft. has porosities ranging from 17.6 to 20.6 per cent and permeability ranging from 73 to 433 millidarcys. Chloride content of 111,000 to 146,900 parts per million in the shaly section contrasts with 4,640 to 16,300 parts per million in the sand section.

Fig. 4 shows two high structural wells 1,500 ft. apart. Self potential follows porosity very consistently in the well on the left and in the upper part of the graph on the right. In the graph on the right, between 7498 and 7505, permeabilities are all less than 1 millidarcy. In the same interval, porosity increases to a high at 7500 and again drops to a low at 7506. It is seen that the self potential follows the porosity profile rather than the permeability.

The graph on the right furnishes another useful comparison of relative porosity and permeability variation. In the highly permeable zone, 7,510-17 ft., porosity ranges from 22.3 to 25.5 per cent and permeability from 1,200 to 4,800 millidarcys. In the low permeability zone above 7,500-09 ft., porosity ranges from 5.0 to 18.5 per cent and permeability is less than one millidarcy. The high porosity average is only double the low porosity average, while the high permeability average is more than 3,000 times the low permeability average.

Average gas-oil contact at 7,270 ft. subsea is marked by a change from a porous zone with no oil saturation to a porous zone showing oil saturation. The gas cap zone is also sometimes highly permeable as in the case of the well on the left.

This pair of graphs brings out particularly well the lack of correlation between wells in respect to permeability of zones of equivalent stratigraphic position. Above the gas-oil contact, we have high permeability on the left corresponding to low permeability on the right. Between the gas-oil contact and the 7,300-ft. subsea line it is seen that the permeability profiles of these two wells are quite different.

Permeability studies.—As the continuity of permeability, or the lack of continuity, is the most important reservoir factor in a pressure mainte-

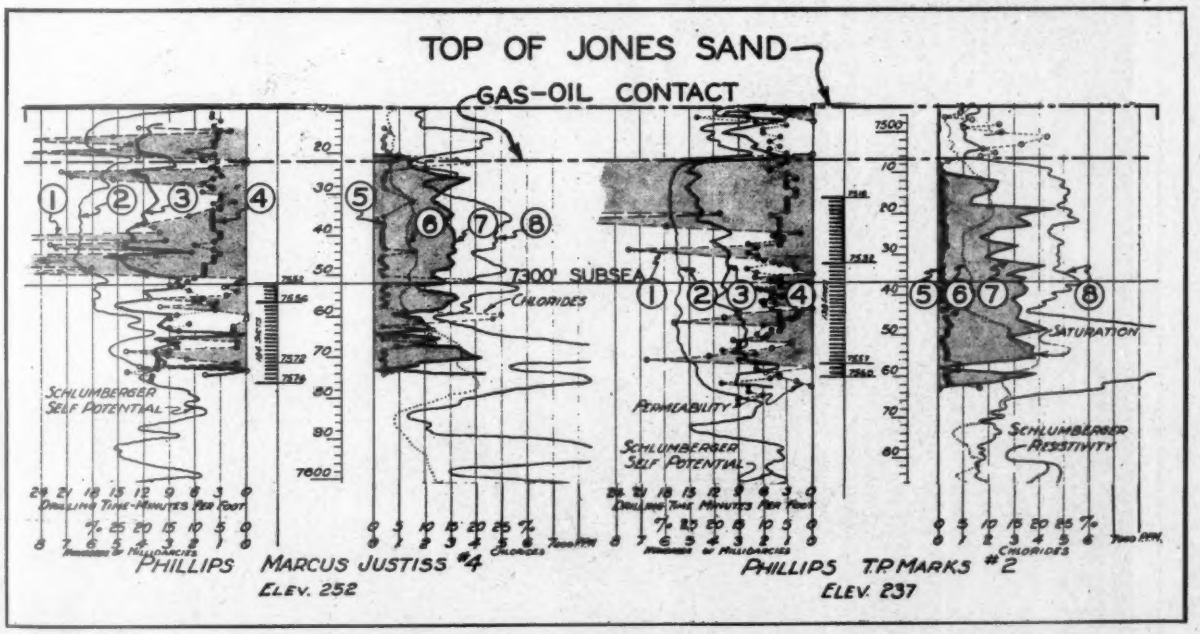

Fig. 4. Core graph of Jones sand Phillips 4 Justiss and Phillips 2 Marks, showing (1) permeability, (2) self-potential, (3) porosity, (4) drilling time, (5) chloride content, (6) resistivity (third curve), (7) oil saturation, and (8) resistivity (normal curve)

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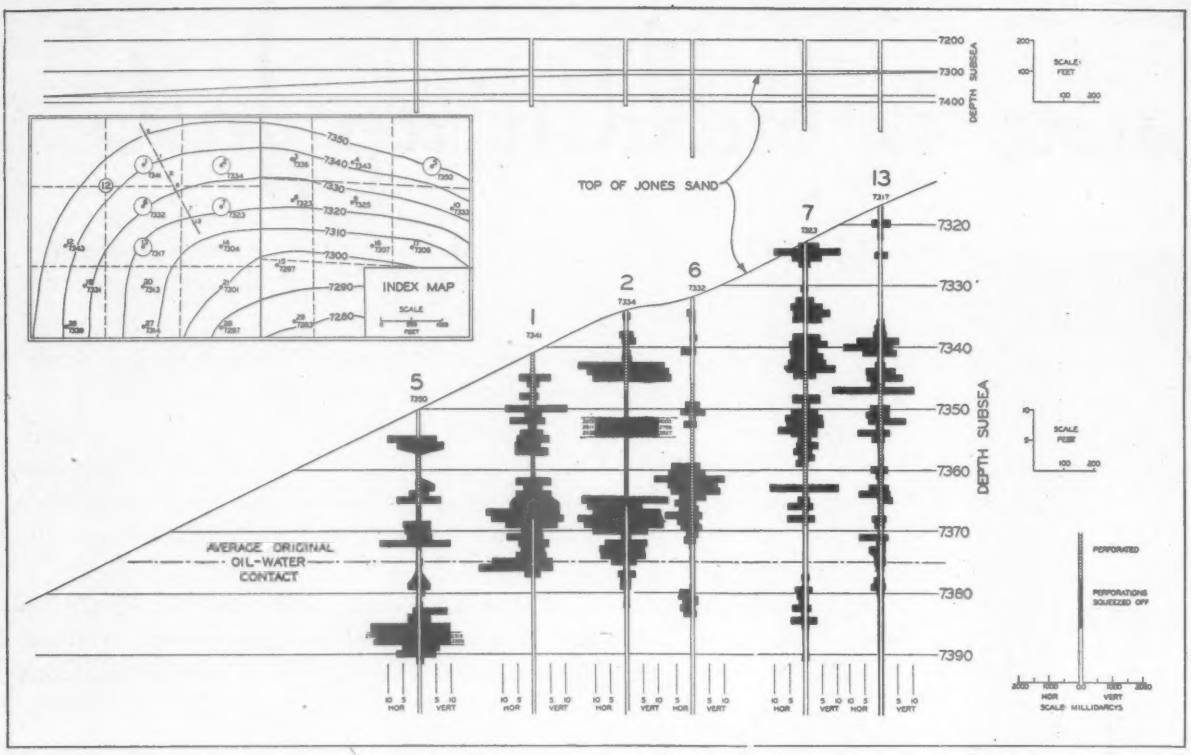

Fig. 5. General permeability cross-section

nance program of gas injection, this has been studied in some detail. Fig. 5 represents a general longitudinal section from northwest to southeast (Fig. 1); top of Jones sand is shown as a horizontal line, and depths are feet below top of the sand. A feature of this cross-section is the highly permeable interval at between 20 and 40 ft. penetration in well No. 15 in the northwest area, gradually thinning until it disappears altogether in the southeast area. Except for such general features, permeable zones do not correlate from well to well.

In Fig. 2 showing permeability profiles for those input wells for which core analyses were made, perforated intervals are also shown. In the case of wells 74 and 85 the upper interval was perforated just before these wells were converted to input wells; in these two cases gas is being injected directly into the gas cap. Position of the average original gas-oil contact (7,270 ft. subsea) in these six input wells is as follows, reading from left to right: 10 ft., 8 ft., 11 ft., 13 ft., 14 ft., 5 ft. below top of Jones sand. This figure also illustrates the lack of continuity of zones of high permeability. Continuous shale or silty partings between permeable zones would cause the injected gas to move parallel to the bedding and restrict its vertical movement; the discontinuous character of such separations in this reservoir provides extremely favorable conditions for the gas-cap type of pressure maintenance. The injected gas, instead of finding a short path to the nearest producing well, disperses in various directions and in various planes, resulting in more effective moving of oil to the well bores.

Fig. 6 is a cross-section of six wells at the northwest edge. This illustrates the general equality of permeability parallel to the bedding (shown on the left) and permeability perpendicular to the bedding (shown on the right).

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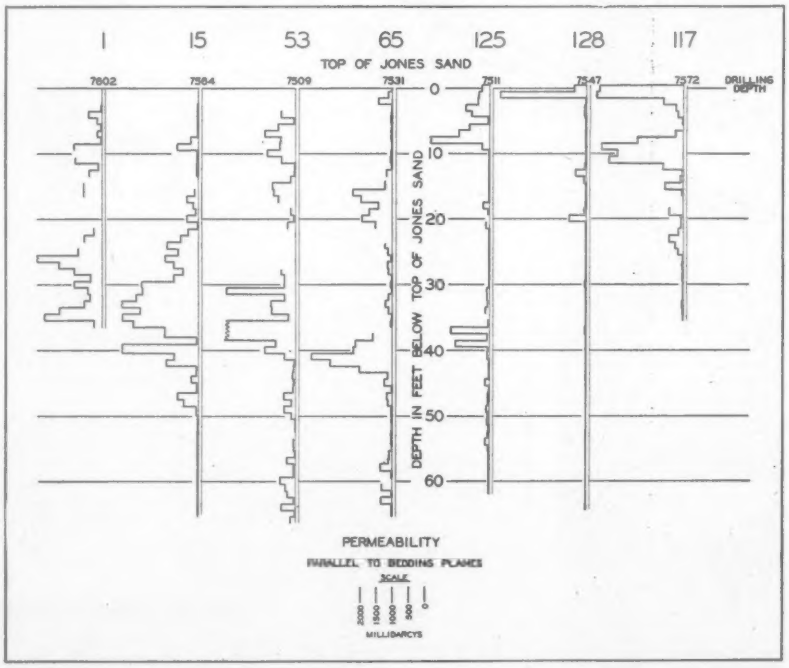

Fig. 6. Permeability cross-section along northwest edge

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PROGRESS IN METALS

by W. L. Nelson

Stainless Irons of Manganese And Chromium

Nickel and manganese are both strategic metals, but at the moment nickel is more scarce than manganese. For this reason, chromium manganese steels have been receiving much attention as a substitute for stainless steel (chromium nickel). This development has been followed on this page, first on page 63 of the August 14, 1941, issue (Substitute High Temperature Steels), and more recently page 46 of the April 1, 1943, issue. The stainless irons, however, have not been studied extensively, according to John M. Parks in the February and March 1943 issues of Metals & Alloys under the title of Chromium-Manganese "Stainless" Irons. Stainless irons differ from stainless steels in that they contain very little or no carbon.

The refinery branch of the petroleum industry is a large user of the stainless steels and irons and hence is vitally interested in the development of substitutes for the now almost nonexistent (for civilian purposes) common chromium nickel varieties. The stainless steels and irons are used for high-temperature strength, resistance to high-temperature oxidation, and resistance to sulfide corrosion. Among such services are: (1) Pipe-still tubes, (2) pipe-still bends, (3) radiant section tube supports in pipe stills, (4) convection section tube supports or sheets in pipe stills, (5) austenitic steels for subzero temperatures, (6) tower linings, (7) instruments, (8) corrosion-resistant parts, etc. The stainless irons are used in the petroleum industry more extensively than the stainless steels; at least the carbon content is most frequently kept below 0.08 per cent.

M. Parks reports irons containing 12 per cent chromium and 12, 20, and 30 per cent manganese, as well as 5 per cent chromium irons with 12 and 20 per cent manganese. The hardness of such alloys decreases with manganese content, and the hardness is not affected much by quenching. This is to be expected because these irons are of the austenitic or solid solution type which exhibit only minor changes in microstructure as the alloy is cooled from high temperatures (completely austenitic at 1,300° F.) to room temperatures.

With respect to corrosion resistance, the chromium manganese irons (and steels) are not the equal of the stainless irons. According to the authors:

"The irons studied have low corrosion resistance to sulfuric acid and hydrochloric acid although they possess fair resistance to nitric acid. Although the literature is saturated with corrosion-resistance data, further tests should be run either under actual service conditions or by use of the Huey test in order to obtain comparable corrosion data."

Extensive cold-working can be practiced on the irons of low manganese contents without failure by overworking but the 12 per cent manganese iron can only be worked to the extent of 60 per cent reduction in area. In this condition, the 12 per cent manganese iron exhibits an ultimate strength exceeding 200,000 lb. per sq. in.

"The commercial use of these irons for structural purposes may be of some importance. At the present stage of development, the ultimate strengths of these cold-worked irons are not equal to the ultimate strengths of the cold-worked chromium-nickel steels although increasing the strength of

(Continued on Page 65)

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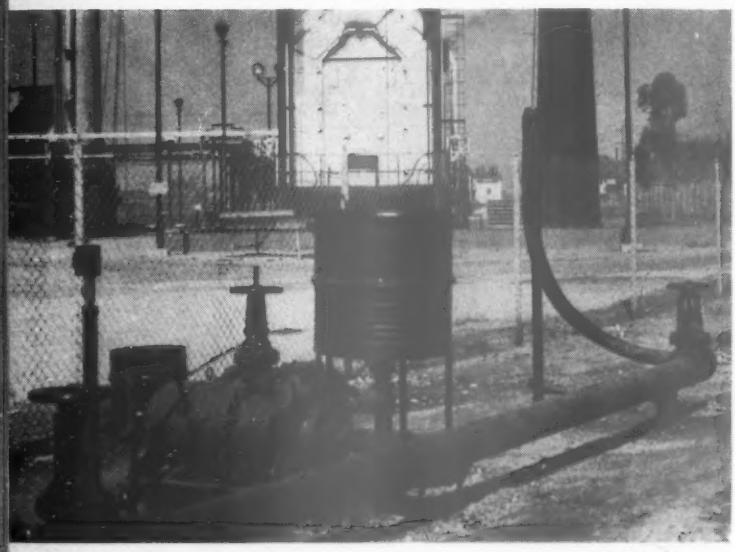
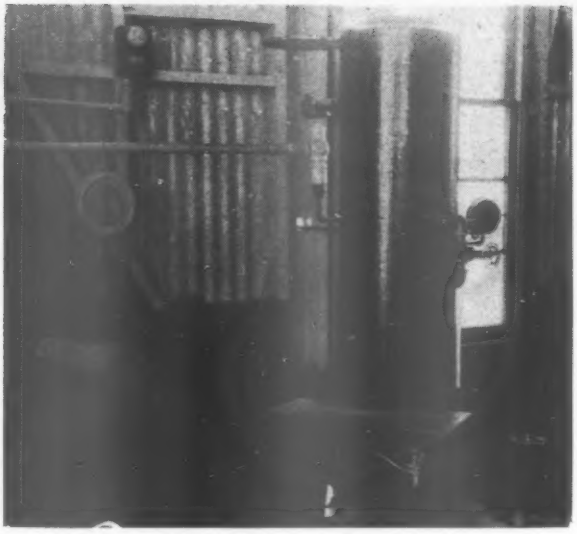
PLANT PRACTICES

Accumulator for Drippings at Refinery Loading Dock

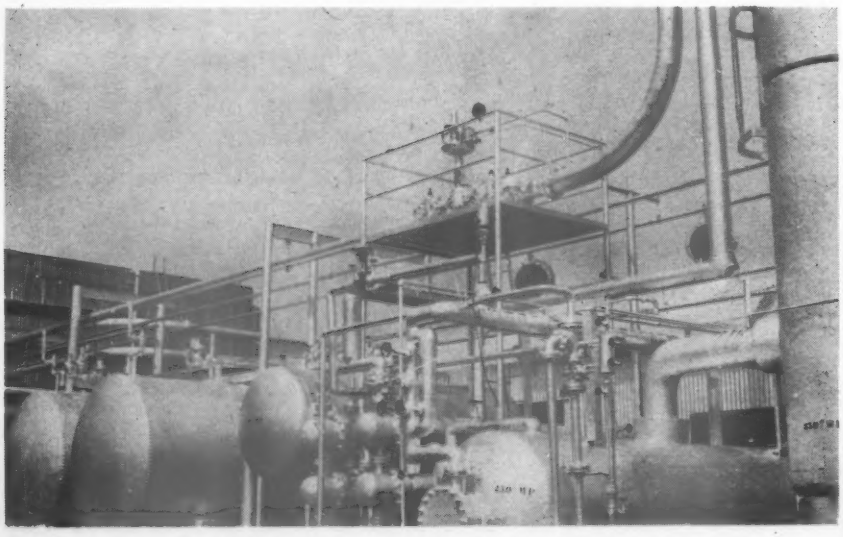
AFTER filling the tank of a transport truck, small amounts of the commodity are left in the loading hose. Ordinarily, this material bleeds to the roadway, quickly forming a pool of oily waste. This condition is prevented at a California refinery loading dock by placing a common oil drum on a pedestal above the suction of the loading pump and connecting it to the intake by a short line with a control plug valve. Whenever necessary the liquid can be returned to the pump and run into the next transport hauling a similar commodity.





Mixer and Injector for Water-Treating Chemicals

AN effective mixer for injecting treating chemicals into the boiler feed-water stream has been designed and built by operators of a large Oklahoma gasoline plant. It consists of a steel shell about 24 in. in diameter and about 5½ ft. high and divided at the midpoint into an upper and a lower compartment. The compartments are connected by a 1-in. line leading from the bottom of the upper compartment into the top of the lower compartment. The desired amount of dry chemical is placed in the upper section, and mixed with water injected through a 1-in. line. The compartment contains a revolving paddle wheel, turned by hand through a wheel at the top, for mixing. When mixed the chemical is drained into the lower compartment by opening the small valve in the connecting line between the two compartments. By means of air pressure applied to the compartment, the chemical then is fed at the desired rate into the boiler feed-water line. The mixer is set up on a small stand over the feed-water line with a small line connection, controlled by a valve, to it. In this case disodium phosphate is being used as the chemical. This is carefully weighed according to needs in scales hung convenient to the mixer.



Landing Platform for Elevated Controls

WHEN the pressure of a fractionating column is controlled in the vapor line from the tower, back-pressure controls and regulating instruments often must be installed some distance above ground level. To facilitate maintenance and adjustment of such controls and instruments, a permanent means of ready access to them is required. In a California installation of this kind, a substantial landing platform has been built beneath the controls. It is of sufficient size that the operator and instrument men have ample room for working, and has a heavy guard rail around it.

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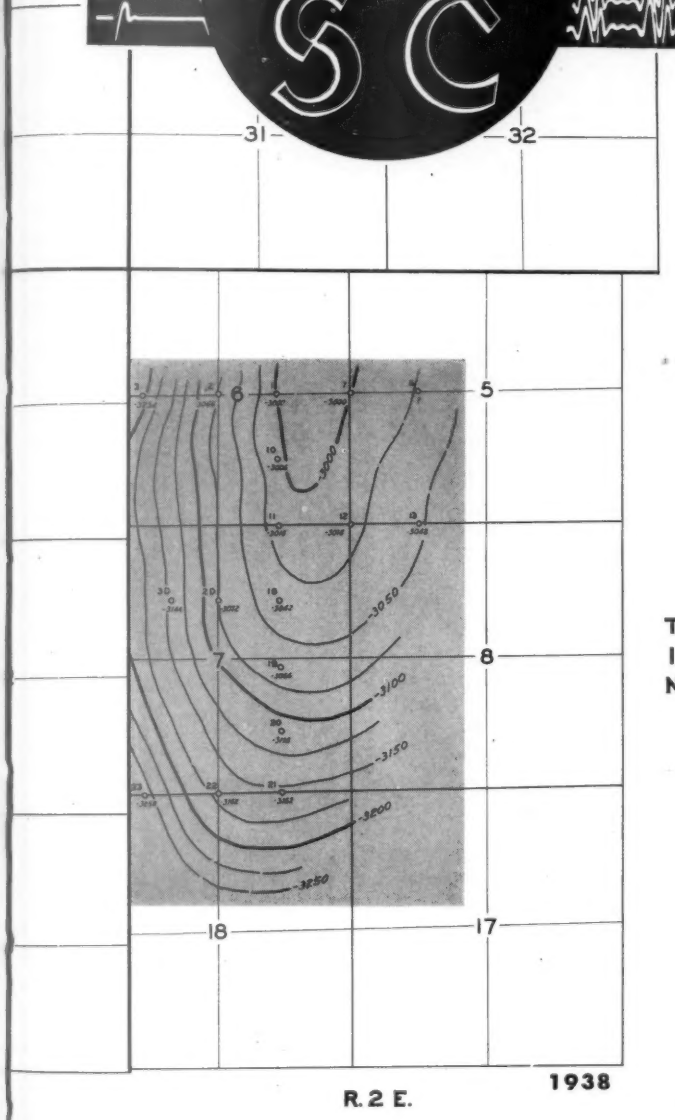
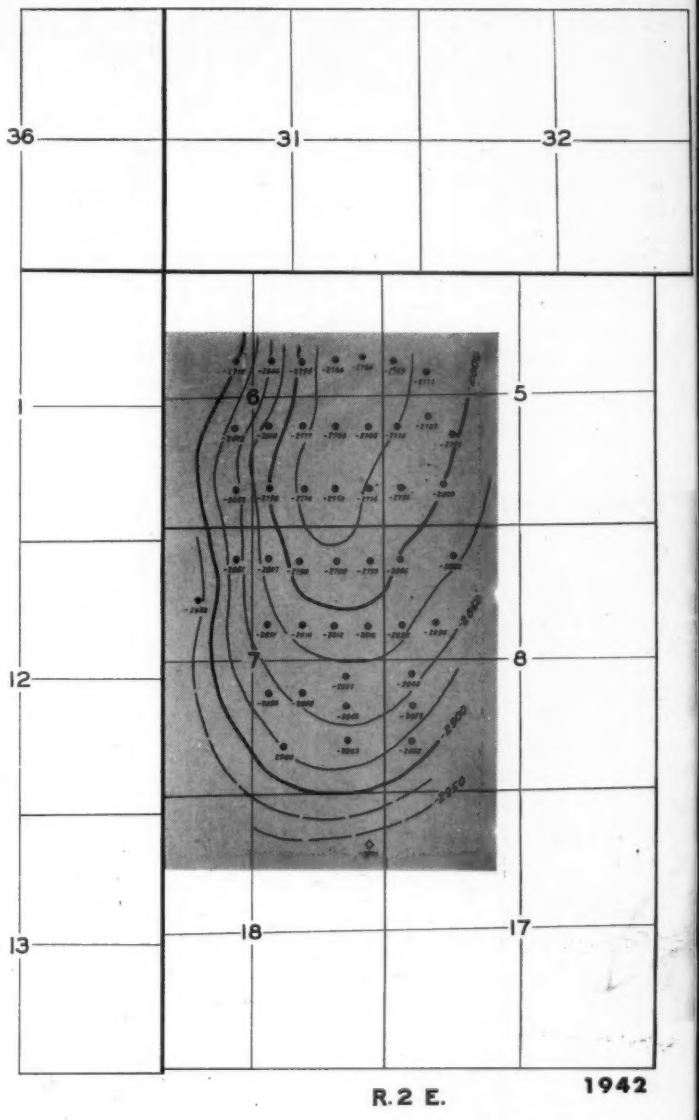


"SEISMIC MAP"

Depths based on an assumed velocity of 12,000 feet per second.



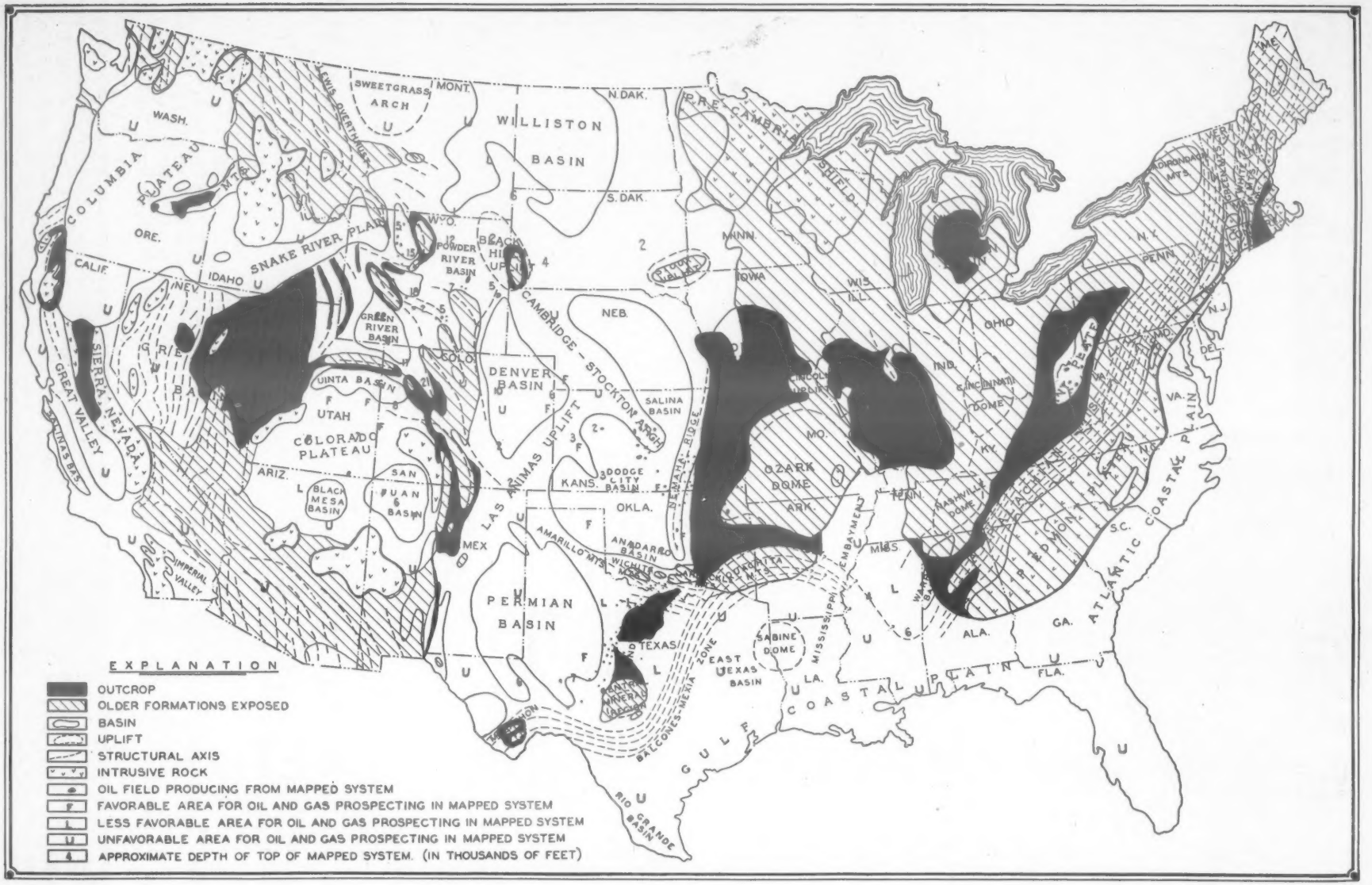
"WELL LOG MAP"

Courtesy of the Illinois State Geological Survey.

A small seismic survey of the southwest corner of the Salem Pool. Shot two years before the first Devonian well was drilled in this part of the field.

Seismograph Service Corporation

Pennsylvanian



OIL ZONES OF THE UNITED STATES

Pennsylvanian

(Compiled by The Oil and Gas Journal)

PRINCIPAL PRODUCING HORIZONS:

Sandstones: Many sands in the Appalachian area, Illinois basin, Kansas, Oklahoma and North Central Texas. Sands in the Magdalena group of Northwest New Mexico and the Tensleep and Minnelusa of Wyoming.

Limestones: Kansas City-Lansing, Tarkio and other limestones in Kansas, Oswego of Oklahoma, Marble Falls, Caddo and other limestones in North Texas.

DISTRIBUTION OF PRODUCING HORIZONS: In the Alleghany Plateau region, Pennsylvanian production is largely limited to the central part of the basin. In descending order the **Little Dunkard** or **First Cow Run** and **Big Dunkard** sands of the Conemaugh formation, the **Burning Springs** sand of the Allegheny and the **Second Cow Run** and **Salt** sands of the Pottsville are the most important. There are also a number of interbedded gas sands and some of these produce oil locally.

In the Eastern Interior Coal Basin, principal Pennsylvanian production is found along the southern end of the La Salle anticline. The higher producing sands, the **Siggins, Casey, Claypool,** and **Upper Partlow** are found in the northern group of fields. In the Robinson, Lawrenceville and Allendale areas, the producing horizons are mainly of Pottsville age and include the **Bridgeport, Biehl** and **Buchanan** sands. Along the DuQuoin anticline in the Centralia area, some production was found in the **Petro** sand and minor production has been obtained from stray Pennsylvanian sands in the western part of the basin. The principal Pennsylvanian producing horizon in Indiana is the **Mansfield** sand of the Pottsville group but there are also some producing horizons above this level.

In eastern Kansas, Northeast Oklahoma and the McAlester basin and extending across the Hunton and Chautauqua arches and the buried Nemaha Mountains are a series of sands which produced most of the oil in the early days of the development of the Western Interior Coal Basin. Of the large number of producing horizons, the **Oswald** lime, **Stalnaker** or **Tonkawa, Layton, Peru, Prue** or **Squirrel, Bartlesville** and **Burgess** sands are the most important in Kansas. The shoestring sands of Greenwood County produce from the **Burbank** sand. In northern Oklahoma the **Hoover** sand is added to this list and towards the south other sands come in, including the **Calvin, Senora, Skinner, Red Fork** and **Glenn.** Farther south, as in Illinois, the producing horizons tend to lie deeper in the section and the **Booch, Deaner-Gilcrease, Papoose, Cromwell, Lyons** and **Dutcher,** of lower Pennsylvanian age are the principal producers.

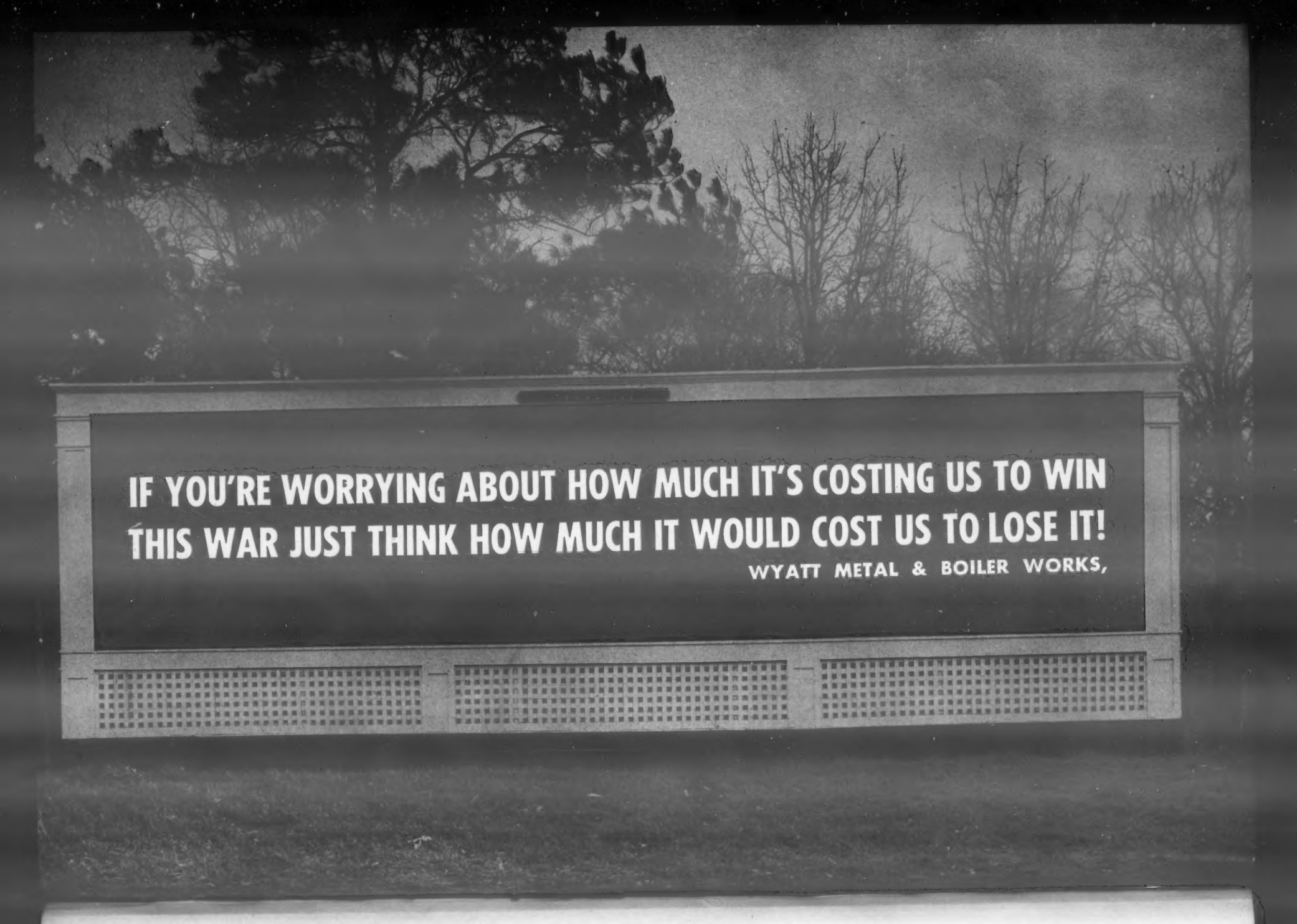
The more important lime production comes from the **Kansas City-Lansing** on the Central Kansas uplift where basin conditions do not exist.

The same general succession from younger to older pays from north to south takes place along the Bend arch and in the Red River district, although in Oklahoma most of the pays are in the Glenn. Deeper drilling on the flanks of the arch is, however, resulting in discoveries in the older **Strawn** series. In the Wichita Falls area, the main pays are in the **Cisco** while the **Marble Falls** lime in the Bend series produced mainly in the Ranger district to the south.

The **Minnelusa** formation which produces from several sands in eastern Wyoming is similar in many respects to the other Pennsylvanian producing horizons, but the **Tensleep,** which is an important producing horizon in Central and western Wyoming is more of a regular blanket sand and extends over a wide range.

EXTENSION INTO OTHER AREAS: Prospects for additional Pennsylvanian production in many of the basins are small because of the intensive drilling that has taken place. This is less true of the basins flanking the Bend arch than of the districts to the east. The Minnelusa production in eastern Wyoming may extend down the east side of the Denver basin and some small pools have already been found in western Kansas. Tensleep production may be expected around most of the Rocky Mountain basins. Multiple pays at Cement and production in Barber County, Kansas, prove that the margins of the Anadarko basin contains Pennsylvanian oil and further exploration within the basin may be expected to find additional fields. In the Salina basin of Kansas conditions appear to have been favorable for Pennsylvanian accumulations although none have yet been found.

GENERAL GEOLOGICAL CONSIDERATIONS: Most of the fields producing from sand are in basins lying near uplifts associated with the Appalachian folding. The wide distribution of Pennsylvanian production is due to the fact that this folding was more widespread than any other in the United States. In most areas, the Appalachian revolution began in the Devonian or Mississippian but the culmination point was during the Pennsylvanian. At this time, the Appalachians, Ouachitas, Ozarks, Arbuckles, Wichitas and other domal or folded areas had considerable relief and were subjected to strong erosion. Contemporaneously the low areas in which the sediments were deposited sank more rapidly than during other periods resulting in a thick alternation of sands and shales with some limestone. The subsidence in the basins was oscillatory so that at times they were uplifted and the recently deposited sediments were subjected to erosion. Where the uppermost beds were limestones, porosity was developed, in many instances permitting the accumulation of oil. Sometimes large areas lay practically at sea level and in these sections coal deposits were formed.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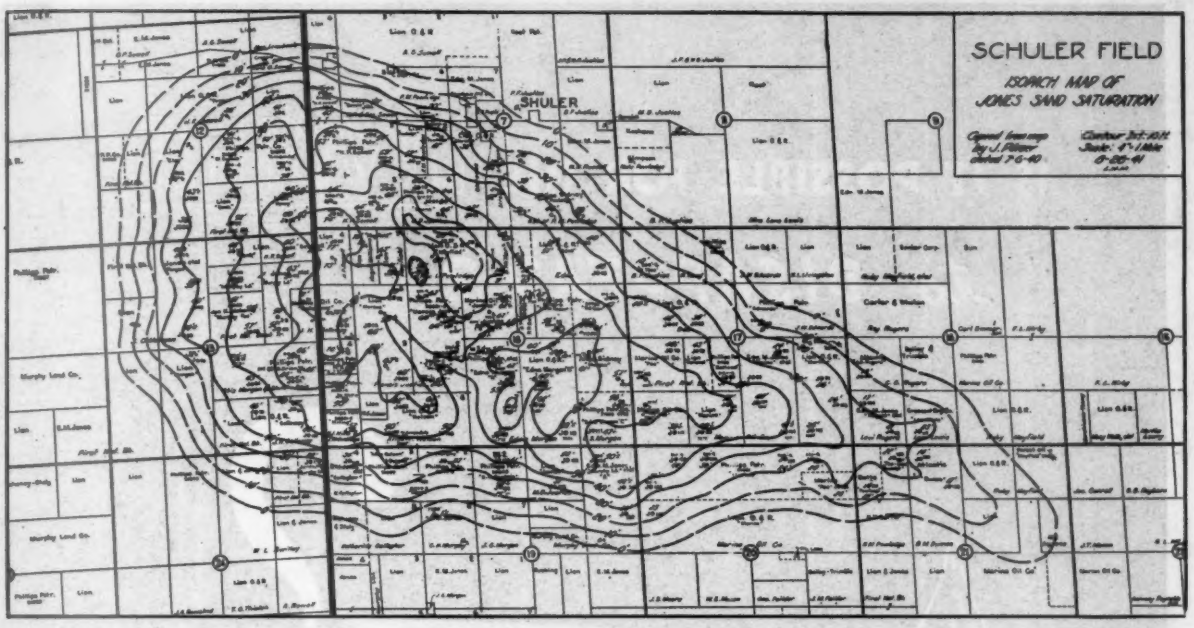

Fig. 7. Productive sand thickness, Jones sand

Unitized Pressure Maintenance at Shuler Field

(Continued from Page 60)

This cross-section is of particular interest in connection with the encroachment of edge water. Low permeability zones of high chloride content are most prominent in two positions: within the first 10 ft., and just below 40-ft. penetration. In Fig. 6, average original oil-water contact is represented as 7,375 ft. subsea. Oil-water contact has been defined[2] as: "The surface in a reservoir above which the predominant saturation (aside from interstitial water) is oil, and below which is water."

The order in which wells 5, 1, 2 and 6 first showed substantial water percentages was as they appear in the cross-section, up dip left to right, indicating the predominant direction of water encroachment to be parallel to bedding in this local area.

Oil-in-place and estimated recovery. —Fig. 7, isopach map, represents the net productive thickness of the Jones sand; portions of the sand section below 10 millidarcys permeability have been deducted as nonproductive. For example, in Fig. 3, from top of Jones sand at 7,563 ft. to a depth of 7,632 ft. there was a gross sand thickness of 69 ft.; deducting a total of 16 ft. having less than 10 millidarcys permeability, a net thickness of 53 ft. was used for the isopach map.

Using the productive sand volume of nearly 150,000 acre feet calculated from the isopach map, and applying 1.45 initial formation volume factor,* the initial oil-in-place is calculated to be 106,000,000 bbl. if 35 per cent connate water is assumed, or 122,000,000 bbl. if 25 per cent connate water is assumed.

The Jones sand was discovered September 17, 1937, and to the end of 1942 had produced 25,550,000 bbl. of oil. Kaveler[3] shows, for a continuation of primary operation, an estimated ultimate recovery of 34,000,000 bbl. (this represents 30 per cent recovery of 113,000,000 bbl.) Under unitized gas injection of 90 per cent of the produced gas volume, it was estimated that the ultimate recovery would be approximately 54,000,000 bbl., an increase of approximately 20,000,000 bbl., even though the secondary operations were not commenced until one-half of the primary production had already been recovered.

2. A.P.I. Vol. 22 (IV) (1941).

*Formation volume factor is defined as[2]: "The volume under reservoir conditions of the oil and its associated gas from which is derived one volume of crude oil."

3. H. H. Kaveler: "The Shuler Field, Union County, Arkansas," New York meeting, American Institute of Mining and Metallurgical Engineers, February 15, 1943.

Progress in Metals

(Continued from Page 62)

the chromium-manganese irons by use of molybdenum, titanium, and other elements may overcome this difficulty. The chromium-manganese irons have equal if not better ultimate strength in the annealed condition compared with the chromium-nickel steels in the same condition. This may be of some importance in the consideration of these irons for welded structures or for casting purposes especially if die casting of steels ever becomes a reality."

Cutting Fluids—Friction Characteristics

Abstract — Schmidt, Gilbert and Boston, "Friction With Various Cutting Fluids," Trans. Am. Soc. Mech. Eng., Vol. 64, pp. 703-9, Oct. 1942. Taken from Jan. 1943 issue of Metals & Alloys, p. 166.

A series of tests were made to determine the lubricating effects of a wide variety of cutting fluids on the forces involved in drilling; measuring methods and apparatus used are described in full. The results of the friction tests show that under conditions of seizure, mineral oils and water produce approximately the same high coefficient of friction at relatively low pressures, and that considerable metal is displaced.

When sulfurized oils are used under conditions of seizure, the friction coefficient is greatly reduced, and there is very little metal displacement or seizure even at high pressures. Emulsions containing active sulfur also reduce the coefficient of friction between the friction surfaces in the same manner as that produced by the sulfurized oils. Only at very high pressures was the sulfurized-oil film ruptured to permit metal-to-metal contact and seizure.

Cutting fluids, even those which possess high sulfur content, high antiseizure properties, and low coefficient of friction in the friction tests, will not decrease the cutting forces unless there is rubbing friction on noncutting surfaces where the antiseizure

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properties become effective. The relative values and distribution of torque and thrust for a drill of 11/32-in. diameter were determined for the drill as a whole and for cutting and chisel edges.

War Production Provides Impetus for Flame Hardening

Although the tremendous war demand for metals is being felt in all fields, certain operations, such as flame hardening have been found to be particularly well adapted to the mass-scale production demanded by war. The reasons for the increased use of flame hardening are mainly the same ones that have brought the process into successful commercial existence, but there are some advantages that have been brought clearly to our attention by the war. The process fits well into continuous production lines, is particularly adapted to controlling the depth of surface hardening, is a rapid process, and is a clean one. Large sized objects that cannot be easily handled or heated in a furnace can be hardened locally as desired, and irregular shaped areas or shapes can be spot-hardened as desired. It is a simple heat hardening operation which does not require special steels, carburized or nitrided surfaces, and it does not use additional metal as does welding. Finally, it is a relatively simple process—one that does not require expensive equipment, scare materials, or the even scarcer commodity, i.e., time.

The advantages of flame hardening are admirably stated by John P. Brosius in his paper before the American Gas Association (March 11 and 12, 1943) entitled, "What the War Period Is Doing to Metal Treating With Gas."

1. Because carbon is the principal hardening agent in steel, it is possible in many instances to substitute a flame-hardened plain carbon steel or casting for a more expensive and, at present, strategically critical alloy.

2. Objects too large to fit inside a furnace may be readily flame-hardened.

3. It is fast. Hardening may be done in a matter of seconds or a few minutes and is thus geared to fit speedy production lines. A few small pieces or rush orders may be treated without delay.

4. Flame hardening may be done on finished surfaces after all machining has been completed, thus saving the difficulty and expense of machining a hardened surface.

5. Generally, flame hardening eliminates or greatly reduces distortion because of the relatively small volume heated compared to the amount of metal remaining cold. Cracking is likewise reduced because of the backing of soft tough metal.

6. Flame hardening produces a clean smooth surface free from heavy scale or pits.

7. Flame hardening may be localized. The hardened areas may be made as small or as large as desired and placed only where they are wanted.

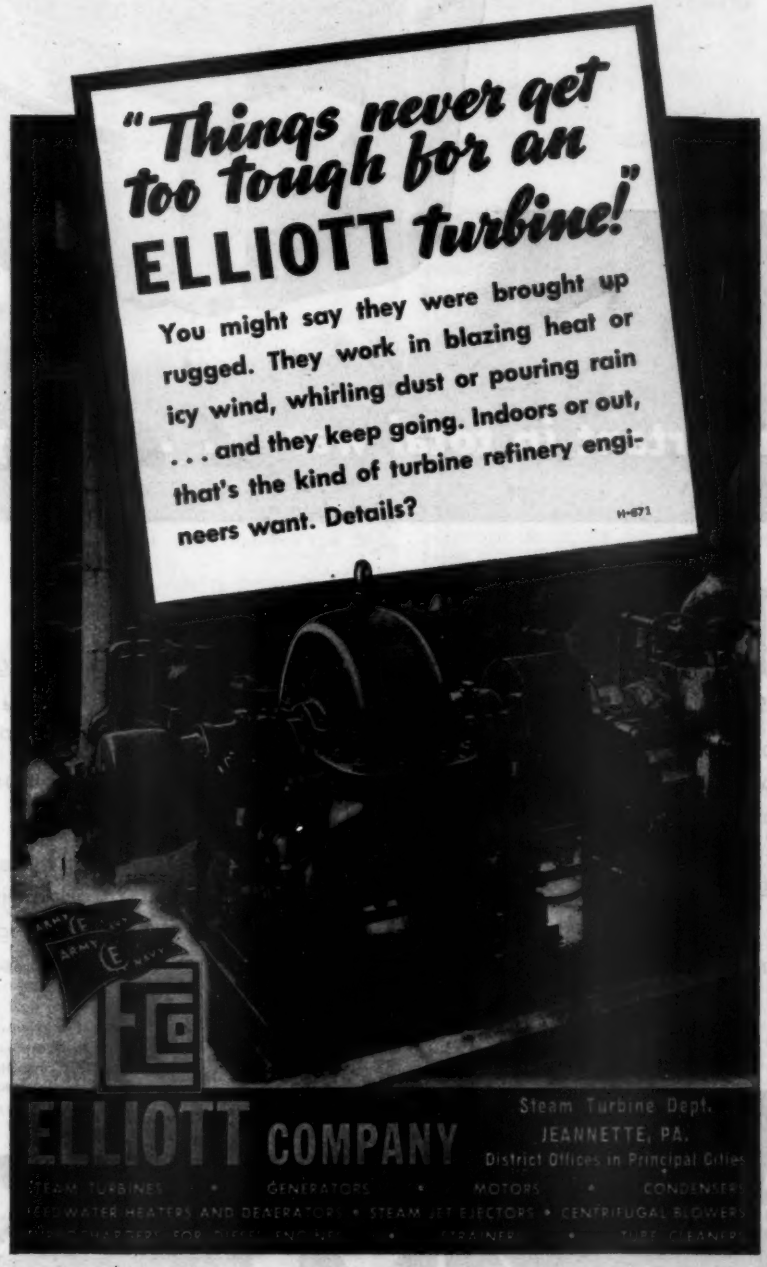
8. The hardness may be limited to a shallow case leaving the balance of the metal comparatively unaffected by the application of the heat. Thus, it is possible to heat-treat a casting or forging for desired core properties (ductility, toughness, resistance to impact, etc.) and subsequently harden the surfaces to be exposed to wear.

Metallurgical Terms

Bark and Decarburization

The decarburized skin found just beneath the scale or rust of a heat-treated object is called the bark.

Decarburization is the removal of carbon from steel. Frequently this inadvertently happens during the heating of steel in the austenite temperature range. At elevated temperatures (austenite area of iron carbon diagram) carbon is soluble in iron, and hence it migrates or diffuses through the solid to the surface of the material where it burns with the oxygen of the air.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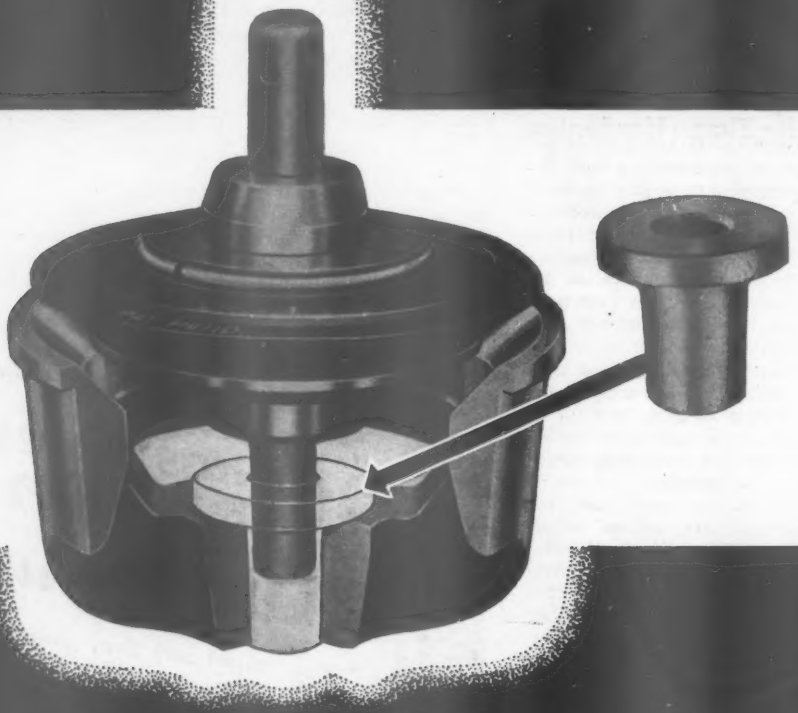

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Engineering Fundamentals

No. 90

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

STATIC-PRESSURE GRADIENTS

THE term pressure gradient is used to refer to the increase in pressure with depth in the bore of a well. Such increase in pressure is due to the additional weight of fluid above the point of measurement at greater depths. In many production engineering problems, data relative to pressure gradients are required for proper analysis of well and reservoir conditions.

A pressure gradient taken in a well after the well has been shut in for a sufficient length of time that the bottom-hole pressure has built up to a maximum value is commonly called a **static-pressure gradient.**

The purposes for which static-pressure gradients are taken include: (1) Determination of the fluid content of a well bore under shut-in conditions; particularly, the location of the contact between oil and water within the well bore. (2) Correction of a pressure measurement from some depth at which a reading was actually taken to a datum plane at some other depth.

This correction to reservoir datum must be made when correlating well pressures to obtain an over-all subsurface-pressure survey of a field. There is no absolute rule which governs the selection of a datum plane for a reservoir, but it is generally selected at a level corresponding to the estimated position of the original gas-oil contact. In case there is no gas-oil contact, the datum should at least be chosen at such an elevation that it will, as nearly as possible, intersect the producing interval of all the wells producing from the reservoir.

A static-pressure gradient is obtained by running a subsurface-pressure gage into a well and taking pressure readings at certain depth intervals. From the difference in the pressure increase for a given interval of depth, the point at which the well fluid changes from gas to oil or from oil to water can be recognized. Also the known gradient for a given interval of hole can be used to compute pressures at depths other than those at which readings were taken.

For most purposes, it is desirable that equilibrium conditions exist in a well before taking the measurements for a static-pressure gradient. Equilibrium conditions exist when the pressure at the bottom of the well has reached a maximum value following production. Successive pressure readings at the same point near the bottom of the well, taken several hours apart, and which give the same result indicate that equilibrium conditions have been established.

When planning a test for static-pressure gradient, convenient intervals of depth for making stops for pressure readings should be chosen. The interval used will depend upon well conditions and the use of the data to be obtained. Often it is desirable to make the stops closer together in one part of the well bore than in another part of the same well.

For example, when taking a gradient to locate the water level, on one well containing only a small amount of water at bottom it would be necessary to take readings at closer intervals than on another well known to contain several hundred feet of water.

Ordinarily the top of the oil level can be located by the "feel" of the line on which the gage is run due to sudden decrease in tension when the gage strikes the oil level. For some purposes it may be desirable to take a reading just above the oil level in order to measure the gradient of the gas column in the well. It is also advisable to determine the tubing-head pressure with an accurate test gage for comparison with the tubing-head pressure recorded by the subsurface gage.

In taking each individual reading of the pressure traverse, the point at which the gage is to be stopped should be approached slowly and the gage brought to a gentle stop. Each stop should be sufficiently long that the movement of the recording drum will be easily readable from the chart.

Most makes of pressure gage are so designed that to obtain the highest degree of accuracy the gage must be calibrated for conditions of both increasing and decreasing pressure. So when using such gages, stops should be made under conditions of increasing pressure while lowering the gage into the hole and at the same depths under conditions of decreasing pressure when withdrawing the gage from the well. The mean of the values determined in this way for each depth may be used as a point for plotting the gradient.

Example

A plotted static-pressure gradient for a well containing gas, oil and water is shown in Fig. 1. On the test the following data were taken:

Depth, ft.—	Pressure (lb./in.²)
0	*500
1,000	513
1,200	584
1,600	727
2,000	870
2,400	1,013
2,800	1,187
3,200	1,373

*Well head.

In determining the pressure at reservoir datum the water gradient should be extended to the bottom of the exposed pay in the well, which in this case is at a depth of 3,442 ft. The density of the reservoir fluid, then, should determine the gradient to be used in correcting back from the pressure at the bottom of the exposed pay to obtain the pressure at datum. In this example the datum is at a depth of 3,260 ft. and the oil gradient is used as representative of the reservoir fluid for all wells in this field.

Projection of the water gradient to 3,442 ft. gives a pressure of 1,486 lb./in.² at the bottom of the exposed pay on this well. Use of the oil gradient to compute the pressure at reservoir datum gives a result of 1,420 lb./in.²

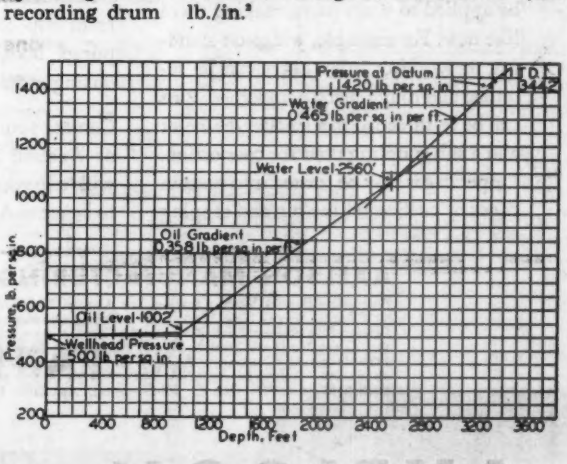

Fig. 1

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

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USE OF PRESSURE BUILD-UP

IN completing a new well that will not flow it is often desirable to get data quickly from which an accurate estimate of the productive possibilities of the well can be made without the necessity of installing pumping equipment. Swabbing is an old method that is often used for measuring the maximum rate at which the sand will yield oil by removing the oil with the swab as it enters the well bore and measuring the volume of oil brought to the surface over a period of time. Often the results of a swabbing test are misinterpreted, however, because of failure to correct for the volume of oil that had accumulated in the well bore preceding the swabbing test. To say the least, the swabbing process requires considerable time and expense, whereas more valuable information could be gotten by swabbing the well only long enough to remove all the fluid from the well and then measuring the rate of pressure build-up by placing a subsurface pressure gage near the bottom of the well to record the pressure increase at that point. Or, if for any reason, it is undesirable to leave the gage in the well, periodic readings of the bottom-hole pressure at a given depth will furnish sufficient data for calculating the capacity of the well.

From a knowledge of the density of the well fluid, which is conveniently gotten by running a static pressure gradient in the well, the increase in pressure for a given time interval as recorded by the gage can be converted to feet of fluid. Then, using the volume per unit of length of the well casing this increase in fluid level in the well can be converted to a certain volume for the given time interval and finally expressed in conventional units of bbl./hr. or bbl./24 hr.

Such data is conveniently plotted as a pressure build-up curve; that is, pressure as ordinate versus time as abscissae. Such a curve is useful for other purposes, such as the determination of effective sand permeability and as a measure of the time required for establishing equilibrium conditions following a production test as well as a basis for estimating the time required to establish steady flow on a productivity-index test.

A second useful curve can be plotted after calculation of the data, that is, bottom-hole pressure versus production rate. It should be noted that such a curve would be equivalent to that obtained on a draw-down pumping test and the slope of the line would represent the productivity-index as defined in Installment 87. Using this curve, one can not only accurately estimate the maximum potential for the well but can also read from the curve the rate at which oil could be produced from the well with a pump at a certain level or with gas-lift maintaining a certain back pressure on the sand. In a case where the well is so large that the bottom-hole pressure cannot be reduced to zero by swabbing, this pressure-production rate curve can be extrapolated for a fairly accurate estimate of maximum well potential. Such an estimate is valuable in choosing proper pumping equipment or other producing facilities for the well.

*See Installment 90.

Example

Problem:

In measuring the pressure build-up for a well the data in the second column, Table 1, were taken.

The well is equipped with 7-in., 24-lb. casing. A static pressure gradient taken in connection with the test indicated that the well fluid exerted 0.365 lb./in.² per ft. of depth.

Make the necessary calculations and plot a pressure build-up curve and a pressure-production rate curve from the given data.

Solution:

The pressure build-up curve as plotted from data is shown in Fig. 1.

The inside diameter of 7-in. 24-lb. casing is 6.336 in. By simple calculations it is found that the volume of one foot of this casing is 0.0389 bbl.

The calculated data used in the construction of the pressure-production rate curve is given in Table 1. As an example of the calculations in Table 1 consider the second period. The gage reading showed that the pressure increased from 158 to 245 lb./in.² These pressures are converted to feet of fluid by dividing by the oil gradient 0.365; this the figures 433 and 671 are obtained. So during the second hour, the fluid entering the hole was sufficient to fill (671-433), or 238 ft. in the casing. This is converted to barrels by multiplying by the volume constant for the 7 in. casing (i.e., 0.0389 bbl./ft.) which for this hour gives a rate of oil entry of 9.26 bbl./hr. In the last column is given the average pressure for each hour, which for the hour under consideration is (158 + 245)/2, or 201.5 lb./sq. in. Values from the last two columns of Table 1 are then plotted to obtain the curve of Fig. 2.

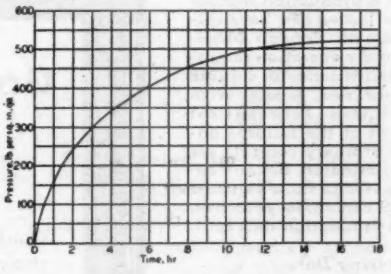

Fig. 1

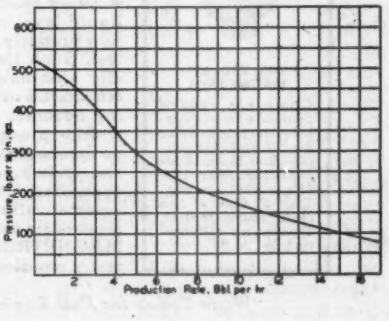

Fig. 2

TABLE 1—Calculation of Production Rates

Time after swabbing, hr.	Bottom-hole pressure, lb. per sq. in.	Fluid above gage, ft.	Increase in fluid level, ft.	Rate of oil entry bbl./hr.	Ave. bottom-hole pressure, lb./in.²
0	0	0	0	0	0
1	158	433	433	16.88	79.0
2	245	671	238	9.26	201.5
3	298	816	145	5.65	271.5
4	340	931	115	4.48	319.0
5	377	1,033	102	3.97	358.5
6	405	1,110	77	3.00	391.0
8	453	1,240	130	2.53	429.0
10	483	1,323	83	1.62	468.0
12	504	1,382	59	1.05	493.5
14	515	1,411	29	0.56	509.5
16	530	1,425	14	0.27	517.5
18	520	1,425	0	0.00	520.0

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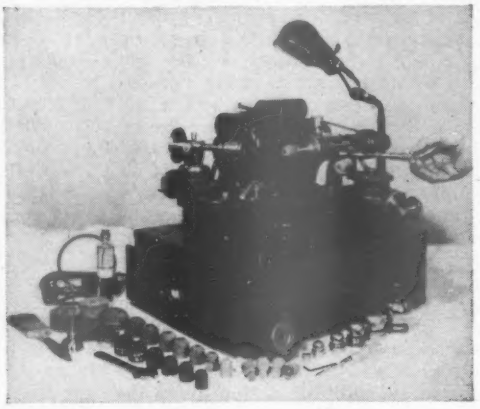

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Cost Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

INFORMATION ON OPERATING COSTS RETURNED TO FIELD OFFICE

ACCOUNTING, to be of any benfit to the men charged with the responsibility of operating a portion of a company, must end where it begins, i.e., in the field or district office of the oil company. This permits the superintendent to determine which wells and leases are showing a profit, which are marginal and which are liabilities. In many companies this is the responsibility of the district office as the management in the main office does not have the time to go over the operation of each individual property and determine whether it is operating at maximum profit.

A number of companies use a system where the accounting procedure is based on the field men and where the results get back to them. Essentially, this system acknowledges the basic conditions, i.e., that accountants are experts in that particular field and often know very little about the details of the operation of producing properties, that most field men are not accountants, and that much of the bookkeeping necessary to the accounting must be carried on in a semi-mechanical manner. The general outline of one system will be discussed here.

Decimal Index System

This system might be compared to the decimal method of filing technical literature in which the various digits describe what the particular article contains in the way of information. Practically all engineers are familiar with this method and some use it religiously. If this method is transferred to accounting, which it is in this particular case, it can be seen that one could completely describe by the decimal system any item of equipment purchased or any job done on a property in the district.

The system is not limited to the field operating expenditures but includes all of the accounts beginning with assets account and going through investments, royalty interests, general office, etc. Each account is assigned a key number and is then broken down further so that the final number shows exactly what the money was spent for or where it came from and in which column it should be entered.

Each lease, and sometimes each well, is assigned a number of three, four or even five digits ending in zero. When a charge is incurred in the field it is assigned to the particular operation on which the equipment or labor was used and the final zero of the lease account number replaced by a number denoting the type of charge. These numbers and charges are as follows: (1) Repairs; parts and maintenance. (2) Repair; labor. (3) Fuel. (4) Pumping labor. (5) Supplies and expense. (6) Power. (7) Dehydrating supplies. (8) Field overhead. (9) Taxes. Thus if the Rathburn lease has been assigned the number of 960 and some parts for the pumping unit are purchased, the invoice is marked with the number 961. Or, if chemicals are purchased for removing water from the oil, the invoice is marked 967.

Operation Index

To further break down what the charges are for, alphabetical suffixes may be used. These include a separate letter for each operation as follows: (A) Boiler repairs. (B) Line pipe and tank repairs. (C) Rods, tubing and cleaning out. (D) Compressor repairs. (E) Cleaning up lease and other repair jobs. (F) Firing labor. (G) Fuel purchased. (H) Company fuel. (I) Boiler compounds. (J) Steam purchased. (K) Gas purchased. (L) Company gas. (M) Repressuring service bought. (N) Dehydrating supplies and expense. (O) Dehydrating royalties. (P) Dehydrating labor. (Q) Transportation expense. (R) Pumping labor. (S) Water. (T) Lights. (U) Power. (V) Other supplies and expense. (W) Lubricating oils and greases. By noting the number 964-G on the invoice it indicates that the expense was on the Rathburn lease, that it was for fuel and that the fuel was purchased, the invoice showing who from.

A separate well-and-lease operating ledger sheet is provided in the main office for each lease or well with its number on it and columns for each of the nine divisions of charges. The lease income is likewise broken down into that from crude-oil production, wet-gas earnings, dry-gas sales, royalties received and other lease income.

The field overhead account also has a number of an appropriate number of digits ending in zero for each district or division and again the final zero is replaced by a number from one to seven to denote the exact charge including salaries and wages, telephone and telegraph, traveling and auto expense, supplies, expense, taxes, miscellaneous and total transferred. If the Whitehorse district is 240 and the charge is for telephone and telegraph, it becomes 242.

Car Expenses

The same is done for automotive expense with each car being assigned a number ending in zero which is replaced by another number from one to eight to show if the charge is for maintenance, gas, oil and lubrication, tires and tubes, repair labor and parts, miscellaneous and taxes, depreciation, insurance and a clearing account. The sheet showing the number of each car includes the details of make, body type, motor number, etc., where the car is located, who drives it, license number and other pertinent details.

When okaying an invoice for payment, the superintendent, engineer or the one charged with authorizing expenditures, stamps it with a ruled impression with spaces for entering the necessary account numbers. Enough spaces are provided for breaking down the invoice so that it may be properly charged. An invoice from one company could include charges which should go into three separate columns or on three different ledgers. The one who authorizes the work shows what this division should be and makes it at the time he puts the OK for payment on the invoice.

When the invoice gets to the office, the bookkeeper simply enters the amounts in the appropriate columns and he doesn't have to guess as to whether the charge is to be made to lease operating expense, overhead or automotive account sheets and there is no guess work as to which columns in one or several of these accounts it is to be entered.

The first step in getting the cost information back to the field is thus accomplished with no added work except the notation of the correct account numbers on the part of the one

okaying the invoice. This is more than offset by the saving of time in the bookkeeping department as the correct entry becomes a routine and mechanical matter.

It is a fairly simple matter under such a system to report back to the district field offices monthly on the income, expenditures and earnings of each individual well or lease. The form selected for this purpose can be used for a well, a group of wells, for a month or any number months, or it can be used to summarize a well or group of wells over any definite period. The same system is used for district overhead and automotive expense accounts.

Report Headings

All of the headings on the report are duplicates of those on the ledger sheets which carry the lease expense account so it is a matter of transferring the monthly totals to the special form. Each of the various headings for income and expenditures on the form is followed by the figures for the particular month and for the total to date during the year with both the total amount earned or spent and the earnings or expenditures per barrel for the two periods being shown. There are thus four columns for the figures and fifth for the various charges on the 8½ by 11-in. paper. The sheet also carries the account number of the lease and the lines are generally numbered, which increases the value from a reference and correspondence standpoint.

Under income is shown the revenue from crude oil produced, the royalty and/or working interest deducted, the value of the net production, the money obtained from wet-gas sales, money received from any royalties, and money accruing to the lease from other activities, if any. These are all totaled as lease, or well, income.

Under production expense is listed in each column the figures on Repairs—parts and maintenance, Repairs—labor, fuel, pumping labor, supplies and expense, power, dehydrating supplies, field overhead and taxes. These are totaled and deducted from the total income to give the gross profit.

The utility of such a report is obvious as it enables the superintendents and engineers to check any property almost immediately. The scanning of the current month's sheet will show not only the cost of operating for a particular month but how this compares with the preceding month during the present year. Previous sheets can easily be obtained from the file to provide the necessary information for reviewing the income history of the lease.

Inclusion of the per-barrel figure of revenue, expenditures and earnings as well as the total figures prevents the ones interested in the report from being misled. It is conceivable that the total figures would show that the operation of a particular property had been improved whereas the per-barrel figure would show the opposite. If only the total figure was given the one examining the report would have to rely on his memory to get the production figure from the record before obtaining the per-barrel cost.

The per-barrel figure also gives some basis for comparison between properties within the district where the one using the report is familiar with the conditions of production. It does not have any great value for comparison between districts as its correct analysis depends on one knowing considerable about the operation of the particular lease. The mere fact that the per-barrel cost of producing oil is high, or the gross profit low, in one area in comparison to another does not indicate that one operation is less efficient than the other.

By breaking down the various items comprising the lifting costs, the effect of any change in the producing procedure on the earnings of a property can be seen immediately. Any sudden rise in cost of any particular item, or for the entire operation, also becomes apparent as soon as the report is received. A change in revenue, either through increased production of salable items or through an increase in price, is also noticeable. For instance, an increase in production through the lifting of proration or some change in procedure would show up immediately in increased income and a decreased per-barrel cost. The report would also show when the revenue from one source was decreasing while that from another source was increasing.

Statistics Shown

In addition to the summary of the accounting of the revenue and expenditures, the report also shows the statistics on the lease, or well, for the month and for the portion of the year already passed. This includes the gross barrels of fluid produced, the water and sediment produced, the total barrels of oil produced, the amount of royalty or working-interest oil produced and the net company oil produced.

The number of producing wells included in the property is set out in another division along with the average gas-oil ratio, average production per well, and average production per day for the month and for the total to date this year. The statistics on gas production are likewise shown including the total wet gas produced, the gasoline production in gallons and the gallons of gasoline recovered per 1,000 cu. ft. of gas sold.

Disposition of the crude oil produced is also listed by amounts run to company charges, to purchasing companies and the oil in storage on the lease. These balance against the gross oil produced.

Value of the statistics in conjunction with the cost figures is obvious as they include the data necessary for establishing decline curves, reservoir performance and evaluation of properties. Together with the financial report they enable the engineer or superintendent to maintain a well-balanced operation.

Occasionally, other items must be added to the list of charges as the method of production changes. For instance, the record of a property which became a part of a repressuring project would have to include the charges for the gas used for this purpose. The adding of an account or column in which these can be charged is a simple matter.

The above system provides for the routine accounting of the cost of operating each individual well or lease but occasionally it becomes necessary to gather more detailed figures and to make a closer evaluation of a particular well or operation. This can best be done by keeping a detailed record over as long a period as necessary. Generally this is done when a decision is to be made on the abandonment of a particular well, the changing of the production processes or the repair of a well.

Conclusion

While the working of the entire system depends on the superintendent or engineer designating the place to make the charge for each expenditure, it does not require either an extensive knowledge of bookkeeping or accounting or an undue amount of work. The superintendent or engineer only needs to know that a certain expenditure for a particular purpose becomes a specific number to show where it should be charged. It eliminates the necessity of any large force of bookkeepers or accountants in the field and district offices and transfers this work to the division or main office.

In return for the effort required to show the appropriate charge number on the part of the one approving expenditures, the field office gets the essential facts on which to base its operations. It prevents the spending of money on a well which cannot possibly pay out and generally it provides for a closer control of the operations under each superintendent. When a new superintendent takes charge of a district, past information by which to judge present performance is available to him.

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Natural Gas

Increased Production Will Meet Black Demand

WASHINGTON, D. C. — Increased production of furnace-type carbon black, used in rubber compounding, will meet both domestic and export requirements, it was revealed at a recent meeting of the Carbon Black Manufacturers Industry Advisory Committee.

The cooperation of the industry during the past 12 months and the initial production of several new plants has resulted in greatly increased production of the furnace-type carbon black. Furnace type and channel-type carbon black are vitally essential for the pigmentation of synthetic and natural rubber, according to Thomas J. Starkie of the WPB Chemicals Division, who was government presiding officer of the meeting.

The easy-processing channel type of this commodity is well in hand, he added, and it will not be necessary to curtail shipments to the printing ink, paint and other consumers of this type of carbon black.

Creation of a carbon black hopper-car pool was considered imperative by the committee in order that maximum efficiency can be maintained with fewer cars of this type. As carbon black is shipped in bulk as well as in paper bags, the use of special lightweight covered hopper cars is required. A car pool, it was point out, would enable the industry to lease part of its fleet of cars to other essential industries whose products are not too heavy for this type of transportation.

Medrano Gas Production Resumed at Modified Rate

OKLAHOMA CITY, Okla.—Production at a substantially modified rate was resumed last week from the Medrano sand gas zone in the West Cement field, Caddo County, Oklahoma. A permanent conservation order will be issued on the field after a hearing before the Corporation Commission June 14.

The temporary order under which modified production was resumed provides for 50 per cent of the April rate of withdrawals from all Medrano sand wells, except three which will remain closed pending issuance of the permanent conservation regulation.

Discovery of oil in the Medrano sand precipitated the shut in order which was terminated June 1. The three wells remaining closed in will be studied further by Bureau of Mines engineers in an effort to determine reservoir conditions.

Allowables Set For Two Gas Fields in Texas

AUSTIN, Tex. — New allowable schedules for natural-gas production in the Rodessa field and in the sour-gas area of the Texas Panhandle were issued this week by the Railroad Commission.

Allowable production from the Rodessa field for June was fixed at 38,460,000 cu. ft. daily. Withdrawals averaging 633,548,000 cu. ft. daily were authorized by the commission from the sour-gas area of the West Panhandle field.

Kansas-Nebraska Hearing Set In Washington, June 22

WASHINGTON, D. C.—The Federal Power Commission last week set hearing at 9:45 a.m., June 22, in Washington, D. C., on an application filed by the Kansas-Nebraska Natural Gas Co., Inc., Phillipsburg, Kans., for a certificate of public convenience and necessity under Section 7(c) of the Natural Gas Act.

The company seeks authority to construct and operate approximately 30 miles of natural-gas pipe-line and appurtenant facilities extending between the company's existing compressor stations in Kansas.

Natural Gasoline

East Texas Plants Set 1943 Record in April

GLADEWATER, Tex.—The 16 recycling and repressuring plants in districts 5 and 6 of East Texas fell to the second lowest point in the past 16 months in the volume of gas processed, but the output of 24 natural-gasoline plants in these districts set a 1943 record of 21,330 bbl. daily, according to reports to the Kilgore office of the Texas Railroad Commission. Output of the recycling and repressuring plants for April was estimated by the commission at 12,591 bbl. daily, compared with 14,096 bbl. daily in March and the 1942-43 low of 12,561 bbl. daily in February.

Daily production included 6,398 bbl. of condensate crude against 8,397 in March; 4,204 bbl. of gasoline against 3,109; 1,716 bbl. of butane-propane against 2,254, and 273 bbl. of other products against 336.

The 16 plants were hooked up to 111 gas wells and 30 injection wells in April, compared with 115 gas wells and 29 injection wells in March. They processed 491,850,000 cu. ft. of gas daily, most of it sweet gas, compared with 535,310,000 cu. ft. daily in March.

The April output of the natural-gasoline plants was the highest production figure since last December, when the daily average was 21,496 bbl. compared with 19,872 in March.

●

Compact Commission Picks Pittsburgh for Meeting

TOPEKA, Kans.—Pennsylvania will be host to the summer quarterly meeting of the Interstate Oil Compact Commission, Gov. Andrew F. Schoeppel, chairman, announced last week.

Meeting in open session in Pittsburgh's William Penn Hotel June 26, the commission will hear eminent authorities discuss war and postwar problems of the petroleum industry and ways and means to alleviate critical shortages of gasoline and fuel oil.

The commission's executive, legal, research, engineering, regulatory-practices, and economics - advisory committees will convene Friday to do their work and prepare their reports and recommendations.

Members of the commission will attend sessions of the annual meeting of the Pennsylvania Grade Crude Oil Association in the William Penn Hotel Friday June 25. Members of that association are expected to remain over for the general session of the Compact Commission Saturday.

General American Buys Ralph Lowe Properties

FORT WORTH, Tex.—The General American Oil Co. of Texas, with headquarters at Dallas, purchased 25 producing wells last week in the Weiner and Keystone pools of Winkler County, Texas. Ralph Lowe, of Midland, Tex., sold the properties to General American for a reported price of $1,000,000, $375,000 of which was in cash, and $625,000 payable out of 30 per cent of the oil. When the oil payment is amortized, Mr. Lowe will receive a one-third working interest in the properties.

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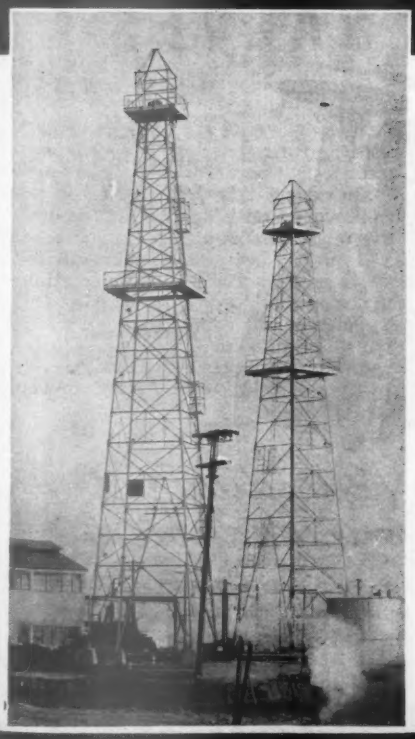

Nine American youngsters are off to repay an old debt. They're riding in a million dollars worth of equipment. They're betting their lives on this jaunt being a round-trip, and there's more to be considered than just flak guns. They're depending on four motors to take them there and bring them back . . . and the gasoline that's making these motors "purr." Thanks to a great industry, the American Oil Industry, the long odds are with them on that score. Back home, fathers, brothers, uncles, cousins are drilling, producing and refining the world's best gasoline and motor oil. Blessed by tremendous natural resources, American Oil Men have, for 81 years, been doing round-the-clock research to make good petroleum products better . . . to produce and process the world's finest fuel. In these days, when freedom actually depends on skill, the ingenuity of American Oil Men is really out in front. To these men who furnish the fuel, as well as the fighting men who use it, we are honored to pay high tribute.

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REFINING

Wyoming Refining Concern Seeking Own Production

CHEYENNE, Wyo.—The Frontier Refining Co., which operates a refinery at Cheyenne, has had an application for a loan of $250,000 approved by the Reconstruction Finance Corp. Of that amount, $145,000 will be used to retire on July 1 the remainder of its first mortgage serial bonds, and the balance will be available for oil exploration purposes.

A year ago the company made a contract with the Defense Plant Corp. for the enlargement of its refinery and for equipping it for the production of 100-octane gasoline, the improvements to cost $4,600,000, and to be financed by the Government. The new units are due to go into operation in September.

In the meantime the company has established a producing department with headquarters in Denver in charge of Dr. Ben H. Parker to acquire its own production. M. H. Robineau, Frontier president, recently informed stockholders that 75,000 acres on five structures in Colorado and Wyoming have so far been leased and that two wells are to be drilled this year. It is understood that the two tests are to be in Colorado and that drilling will start as soon as unit agreements finally are approved in Washington.

Alcohol-Blend Costs Cited by Federal Bureau

WASHINGTON, D. C.—Blending of alcohol with gasoline, a substitute method of augmenting motor-fuel supplies which has received new agitation during the current eastern shortage, would measurably increase costs. This conclusion was reiterated last week in a report by the National Bureau of Standards, Department of Commerce. "The research carried on so far," declared Dr. Lyman J. Briggs, director of the Bureau of Standards, "has covered the possibilities of converting various alcohols of vegetable origin to hydrocarbon fuels, and the suitability of fuels partly or wholly of vegetable origin for use in nonmilitary vehicles. The latter phase of this work has included a laboratory study of the volatility and water tolerance of blends of ethyl alcohol and of acetone with selected petroleum fractions, with gasolines, and with a typical naphtha, and of acetone-ethanol-butanol blends. Engine tests were made to determine the durability of fuel-pump diaphragms when handling these blends. Starting tests were carried on in automobiles using these blends during the winter, and are being continued in a cold room. Engine tests are being made to determine power output, fuel consumption, and requisite engine alterations when operating on selected fuels of vegetable origin. Engine wear tests on these fuels are in progress.

"Gasoline substitutes, even if not subject to tax, will be several times as costly as gasoline, and will yield fewer miles per gallon. With proper readjustment of carburetor and ignition timing, power and performance should be as good as with gasoline. Substitute fuels may be composed wholly of vegetable products, or may consist partly of these materials and partly of heavy petroleum naphtha. So far, test results have not disclosed any feature which would prohibit the use of these fuels in present engines, although tests to determine the amount of wear in engines using these fuels have not been completed."

Ashland Completing Units To Feed Aviation Plant

ASHLAND, Ky.—New construction work and redesigned facilities required to satisfy demands for charging stock at a new aviation-gasoline unit soon will be completed in the existing refinery here of Ashland Oil & Refining Co., according to the current issue of the company's publication, "The Ashland Log." The redesigning of Ashland's present facilities so they will coordinate most efficiently with the new aviation unit is being handled by the Refinery Engineering Co., in cooperation with the company's own engineering department.

A new vacuum tower and necessary supplemental equipment are being installed as the major phase of the program. The new tower is 103 ft. high and is set in a steel superstructure which rises 120 ft.

Sections of the tower are made from shells of other towers. Bubble trays and side-to-side trays were all fabricated at the plant instead of being acquired as complete assemblies from war-burdened mills and shops.

The vacuum tower is designed to yield five products: gas oil or diesel oil, bulk distillate which will be used for charging stock for the new refinery, slop wax for the Dubbs cracking plant, cylinder stock for lubricating-oil manufacture and asphalt. The unit was installed primarily for the bulk distillate which is essential to operation of the aviation-gasoline plant.

Addition of the vacuum unit involved certain redesigning of other equipment used in connection with this facility. A preflash tower was added and the present crude-fractionating tower redesigned, the purpose being to more fully fractionate all gasoline, naphtha, and kerosene cuts before the reduced crude enters the new vacuum tower.

As part of the revamping job it was necessary to design and fabricate 19 units of heat exchangers, coolers and reboilers in the present units so that they might more effectively tie in with the new plant. Of these, eight are used for preheating crude, four are for the overhead condenser on the vacuum tower, two are side-cut stripper reboilers and five are product coolers.

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PIPE LINES

New Cities Service Unit Prepares for Construction

Weather has interfered with aerial surveys for the 240-mile 26-in. natural gas line from a point near Guymon to Blackwell, Okla., by Cities Service Transportation & Chemical Co. The only contract let so far has been one to Aero Exploration Co. for the survey. It is believed that the line will be started in the fall.

Construction will probably be handled according to standard practices, with the laying of pipe contracted and protection furnished by coating and wrapping.

Elsewhere in this issue is an article regarding the establishment of the company's office at Ponca City, Okla., this week and matters involved in the problems of taking gas from the Hugoton field.

Army and Navy "E" Awarded Williams Brothers

The first pipe-line contracting firm to be awarded an Army and Navy "E" citation was Williams Brothers Corp., Tulsa. The award was transmitted last week by James Forrestal, under secretary of the Navy. His letter, in part, read: "The Army and Navy are conferring upon Williams Brothers Corp., now engaged in fuel pipeline installation, the Army-Navy production award for outstanding performance in wartime construction."

PIPE-LINE PERSONALITIES

JOHN L. CREED, known through the Southwest as "Johnny Creed," became superintendent of Portland Pipe Line Co. more than a year ago. Going to New England as he did after many years in Louisiana, he was unprepared for a climate where temperature drops to 52 degrees below zero as it did at the Lancaster, N. H., pump station last winter.

He was brought up in pipe lining as his father was a machinist foreman in the pipe-line department of Standard Oil Co. of Louisiana from shortly after the laying of the first line until his death in 1915. After working as machinist helper in his father's repair shop in the Caddo field in the summer of 1909, Mr. Creed was a machinist apprentice for the W. K. Henderson Iron Works, Shreveport, La., for the next three summers.

He really began pipe lining as oiler in 1913 for Standard of Louisiana in his eighteenth year. His career before the last war was as follows: Laborer, Gulf Refining Co., 1915; pump station engineer, Standard of Louisiana, 1915-1917; chief engineer diesel-electric power plant, Compania des Minorles et Metales, Villadoma, Nuevo Leon, Mexico, 1917; United States military service, 1917-1919.

After returning from World War I, he held the following positions with the Standard of Louisiana pipe-line organization: Machinist helper, 1919; day engineer, 1919-1921; chief engineer, 1921-1924. For 14 years he was superintendent of tank farms for Standard of Louisiana producing, crude-oil-storage and pipe-line departments. From 1938 to May 1942, he was claims and right-of-way agent for the Standard of Louisiana pipe-line department, until assuming the duties of his present position of supervising movement of crude oil from Portland, Me., to Montreal, Que.

Education has been part of Mr. Creed's program throughout his

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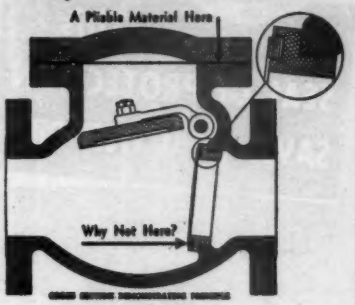

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VALVE

Equipped with Wheatley Synthetic Seal—a synthetic rubber ring dovetailed and fitted into a removable bronze seat also dovetailed to accept this rubber ring. When the bronze clapper falls against this rubber, a perfect seal is formed regardless of what irregularities have deposited on the seat or in the fluid, such as sand, scale and cuttings which under pressure ordinarily would completely cut out a hard-surfaced seat.

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Sizes 2" to 24"
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- The rubber ring conforms to all deposits and obstacles and makes it possible for this valve to seal under the worst conditions.
- Seals regardless of viscosity.
- Operates equally well on kerosene or crude.
- Absolutely silent in operation. Ideal for refineries and pumping stations where the slapping of metal check valve clappers is annoying.
- No lapping or grinding of seats necessary.
- Renewable bronze seat ring, into which the rubber ring is inserted, can be replaced by the standard metal to metal seat, if desired.

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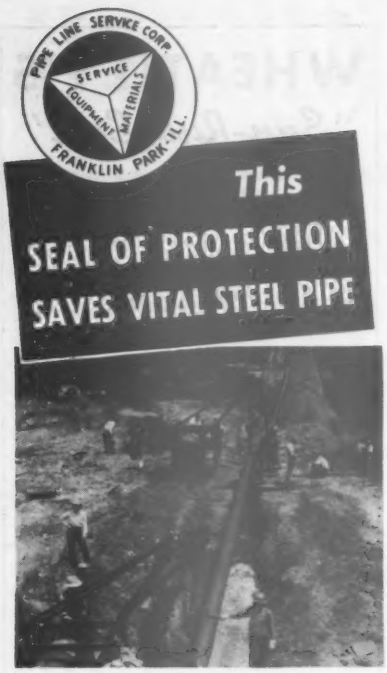

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varied activities. He started with only 6 years of elementary schooling. In 1922 and 1923, he studied business administration by correspondence. At Centenary College night school, he was coached for the bar in Louisiana law, 1932-1934, and he completed a 4-hour course there in advanced English in 1936.

He brings to the important Portland-Montreal system a lifetime of experience in all phases of pipelining as well as a happy faculty for maintaining pleasant relations with those with whom he deals which is of particular value in operating across the rugged New England country where people have not been familiar with the nature of crude-oil pipe lines.

Pan American Acquires Part of Standish Lines

The Pan American Pipe Line Co., as of June 1, took over the gathering system of the Standish Pipe Line Co. in the League City pool, Galveston County, Texas, and the Standish trunk line from the area to the junction with Pan American's pipe-line system 2½ miles east of the field.

The same date, Pan American Production Co., the crude-oil purchasing agency for Pan American, posted League City crude on the same basis as the Gillock-Dickinson postings.

Below 21 gravity was posted at 95 cents a barrel, with an added 2-cent differential plus up to and including 40 gravity and above, topped at $1.35.

Normal Conditions Being Restored Along WEP

Water has gone down so that the tracks leading north from the WEP Norris City terminal are clear and it is possible for normal operations to be resumed following the recent flood period. Although schedules for June shipments have been stepped up to 8,910,000 bbl. which calls for average movements of 297,000 bbl. daily through the War Emergency Pipelines, Inc., Longview-Norris City 24-in. line, an insufficient number of tank cars have been arriving to handle such a movement in the past week.

Total deliveries out of Norris City by tank car to the Ohio Pipe Line system at Enfield, Ill., averaged more than 143,000 bbl. for the first 6 days of June; of this an average of nearly 84,000 bbl. went by tank car direct from Norris City and an average of more than 58,000 bbl. went to the Enfield, Ill., station of Ohio Pipe Line for transshipment to tank cars at loading racks on the system. These deliveries amount to what is believed to be less than half of the carrying capacity of the line. Records of deliveries to Enfield were broken June 2 by shipments of 75,427 bbl.

Tank cars continue to be loaded as fast as they arrive at Norris City. There is no prospect of approaching the demands of schedule unless 900 to 1,000 cars can be available daily at Norris City. Ability to handle 1,275 cars daily has been demonstrated.

Up to the beginning of this week, a total of 631 miles of pipe had been laid for the eastward extension of the WEP crude line of which 524 miles was 24-in. and 107 miles, 20-in. More than 115 miles of 20-in. have been laid for the products line up to the night of June 6.

WPB Approves Stanolind's West Texas Crude Outlet

War Production Board approved construction of a new crude-oil pipe line to have a daily capacity of 54,000 bbl. from Sundown, Tex., to Drumright, Okla.

The pipe line, which will extend 383 miles, was recommended by Secretary Ickes as petroleum administrator for war. Construction is expected to begin early in October, Ickes said, and the line should be in operation sometime in March 1944. It will be built and operated by the Stanolind Pipe Line Co. Approximately 44,600 tons of steel will be required for the line. The estimated cost is $7,000,000.

The pipe line will bring crude oil to refineries in the Mid-Continent area, where crude-oil reserves are declining, Mr. Ickes said.

Oil for the line will come from "one of the last substantial crude-oil reserves with producing capacity in excess of present pipe-line outlets yet developed in the Southwest," Mr. Ickes added.

The Stanolind company has indicated it will send the bulk of the line's delivery to its Whiting, Ind., refinery through the company's present pipe-line system, which runs from South Texas via Drumright to Whiting. Crude oil not shipped to Whiting will be made available to other pipe-line systems operating through Drumright, Mr. Ickes said.

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Aspects of Stanolind Project Are Discussed

Since the announcement of PAW approval of Stanolind Pipe Line Co.'s project for laying a line from West Texas to Drumright, Okla., several aspects of the undertaking have been discussed. Although the diameter of the line was not officially mentioned, it is assumed that this will be 16-in., as specified in the company's application.

Contrary to some previously published reports, the Stanolind company definitely expects to operate the new line so that the capacity will be sufficient to share with other companies; this would be done with low joint tariffs. Such a policy was specified in Stanolind's PD-200 application.

Operating with one station, 54,000 bbl. could be moved through the line. In the immediate future it is anticipated that Standard Oil Co. (Indiana) refinery capacity for handling West Texas crude will be about 25.000 bbl. daily. The company has been refining West Texas crude for more than 10 years at a rate which has climbed recently from 7,000 to 13,000 bbl. daily.

As a result of an expansion program, the new capacity figure of 25,000 bbl. daily for West Texas crude will be reached. But there will be considerable excess capacity in the new line available for other companies desiring the use of these facilities. It is possible that Stanolind may use some of this for themselves for several months in order to run surplus West Texas crude into the large tank farm of the company at Cushing, Okla.

The Standard of Indiana interests are reported as looking forward to extensive buying of Kansas and Oklahoma oil. At present it is drawing heavily on stocks of Kansas and Oklahoma crude in storage which will soon be exhausted. Oklahoma and Kansas crude will be preferred and Standard of Indiana is expected to purchase all that it can obtain.

At a later date, with the construction of seven additional stations, bringing the total to eight stations, the line will be able to move 116,000 bbl. daily.

Arrangements have not been completed for obtaining the pipe. Announcements regarding letting of contracts for construction are not to be expected until shortly before deliveries of pipe are in sight. October is regarded as the earliest month that work could start.

Texas Pipe Lines Valued Higher Than Railroads

The comptroller's department has announced 1943 preliminary intangible values of Texas oil pipe lines totaling $38,255,920 compared with final 1942 values of $37,076,800.

Preliminary values of Texas railroads was fixed at $36,367,885, an increase from the $32,941,900 final 1942 figure.

Hearings on the valuations will be conducted by the state Tax Board June 7-21 before the final figures are fixed.

Valuations above $1,000,000 are as follows:

Company name—	1943 preliminary	1942 final
Atlantic Pipe Line Co.	$3,732,400	$3,606,800
Gulf Refining Co., Houston pipe-line division	3,070,000	2,919,200
Humble Pipe Line Co.	7,136,400	6,982,200
Magnolia Pipe Line Co.	2,381,000	2,110,700
Shell Pipe Line Corp.	3,110,200	2,550,000
Sinclair Refining Co., pipe-line department	5,175,100	4,895,300
Texas Pipe Line Co. (including 42½ per cent interest in Texas Empire)	2.749,000	1,709,200
Texas-New Mexico Pipe Line Co.	2,526,500	2,363,500
Pan American Pipe Line Co.	1,571,300	1,456,200

Pipe Lines Recover From River Crossing Breaks

Work has been going ahead to restore operations interrupted by breaks which occurred during violent floods of last month. At the end of last week, water had not subsided enough to carry on construction work in the St. Charles, Mo., area. The 12-in. line of Sinclair Refining Co. was reported to be still out of service. The Ajax Pipe Line Corp. has only one 10-in. line in service across the river in this area and is trying to repair a second 10-in. line. The Oklahoma Pipe Line Co. is said to have two temporary 4-in. lines across the South Canadian River in southern Oklahoma where three 8-in. lines were broken by the flood.

Gulf Refining Co. has put the Valmeyer station back in service after it was inundated by flood water for 2 weeks; this is located 3 miles from the Mississippi River and 25 miles south of St. Louis, Mo.

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CONTINENTAL

Exploration and Drilling

Week's Highlights

THE quarterly report of the Interstate Oil Compact Commission just received presents some interesting data on stripper wells. These wells make up nearly three-quarters of all producing wells in the United States and produce one-seventh of the oil. The average daily production of the stripper wells is 1.9 bbl. while that of the other wells amounts to 29.2 bbl., making the national average 9.3 bbl.

Estimates of reserves of stripper properties are approximately 6 per cent of the national total and it is stated that an additional 2,500,000,000 bbl. could be recovered from stripper properties by secondary recovery at an adequate price.

In the 22 producing states, 6 have only stripper production and in 4 other states more than 90 per cent of the wells are strippers. In the 16 states having both stripper and nonstripper wells, the average price received for stripper production is below the average price for all oil in all states except Michigan and Nebraska. The difference ranges from 22 cents less per barrel in Louisiana to 1.6 cents more per barrel in Michigan.

Thus, if the price of crude is too low, as many believe, the stripper operator is working under a double handicap. He not only gets little oil but he also gets less than the average price for what he does produce.

Since the possibility of a price increase appears to be somewhat remote at the present time, other ways of aiding the stripper-well operator must be provided if the trend to more rapid abandonments is not to be accelerated. Direct subsidies are not wanted by the industry and a price increase for stripper production which is not applied to all oil would also not be a workable answer.

Some measure of relief might be provided by a graduated tax system whereby the states would levy higher taxes on flush production and reduce it to zero on stripper wells. Adjustment of the depletion allowance so that operators could deduct $1,000 yearly from the production on each well before applying the normal allowance would also work out to the advantage of the stripper-well operator.

Then, too, the stripper-well operators could, in the great majority of cases, reduce their expenses by unitizing their properties. Desirable though an increase in price may be, the effect is the same if costs are lowered and it does not appear that the stripper-well operators have done everything that could be done along this line.

SOUTHWEST TEXAS: The Edwards lime discovery in the Imogene area, Atascosa County, looks better following completion of a good producer 1½ miles southwest of the discovery well (p. 91).

LOUISIANA GULF COAST: The greatest producing depth, 13,266 ft., recorded in the De Large field may be exceeded by a test in the same field now coring at 13,450 ft. (p. 93).

WEST TEXAS: A deep test, planned to go to the Ordovician has been staked in Reeves County (p. 94).

CANADA: The Canadian Geological Survey is planning an extensive search for oil in the western provinces (p. 92).

NORTH TEXAS: A north outpost to the Joy pool, Clay County, flowed at the rate of 12,000 bbl. daily from the Mississippi lime (p. 85).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended June 5, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Penn., W. Va.	52	11	2	65	116,995	1,363	1,524
Ohio	5	10	10	25	60,640	342	410
Indiana	2	0	3	5	10,464	102	139
Kentucky	0	0	2	2	3,412	133	95
Illinois	13	0	12	25	59,216	721	648
Michigan	0	1	6	7	17,502	185	282
Kansas	20	0	14	34	114,881	642	617
Nebraska	0	0	1	1	3,723	12	19
Missouri-Iowa	0	0	0	0	0	5	9
Oklahoma	6	1	12	19	64,089	451	558
Texas:							
North Central Texas	13	1	15	29	93,614	517	534
West Texas	7	0	3	10	39,908	350	738
Texas Panhandle	4	0	1	5	15,465	76	189
Eastern Texas	3	0	1	4	32,325	107	181
Texas Gulf Coast	3	1	7	11	146,910	170	361
Southwest Texas	8	0	13	21	114,498	365	577
Total Texas	38	2	40	80	442,720	1,585	2,580
North Louisiana	4	0	3	7	14,188	129	204
Louisiana Gulf Coast	7	0	2	9	82,747	146	235
Total Louisiana	11	0	5	16	96,935	275	439
Arkansas	4	0	5	9	46,684	104	61
Mississippi and Southeast	0	0	6	6	29,277	32	25
Montana	3	0	2	5	10,862	75	65
Wyoming	2	0	0	2	9,963	50	40
Colorado, Utah	0	0	0	0	0	5	4
New Mexico	2	0	0	2	8,474	89	110
California	23	1	7	31	131,107	516	333
Total United States	181	26	127	334	1,217,944	6,687	7,959
Total previous week	188	33	118	339			
Week ended June 6, 1942	173	41	102	316			

N. CENTRAL TEXAS

Joy Extension Well Makes Big Flow From Mississippian

WICHITA FALLS, Tex.—Consolidated Oil Co. 1 Viola Myers, north extension to the Joy Mississippi lime pool in south Clay County, flowed 504 bbl. 47-gravity oil in 1 hour to establish a daily calculated potential of 12,096 bbl. Saturated Mississippi lime had been drilled from 5,985-6,062½ ft. Completion gage on the new pool opener, Continental Oil Co. and W. B. Omohundro 1 Stephens, G. W. Tipps Survey, 2 miles north of Buffalo Springs, showed 120.65 bbl. oil and 9 bbl. water in 6 hours for a daily potential of 483 bbl. Pay was drilled from 6,011-49 ft. A west offset has been started to this new strike, as 2 Stephens.

Cooke County.—Snuggs, Seitz & McElreath 1 Percy McGeorge, 1 mile south of production in the Walnut Bend pool, drilled to total depth 6,010 ft., failed to develop production in the Winger pay sand of the lower Strawn series, and perforated from 4,286-4,302 ft. in an effort to complete the well as a producer from the upper Strawn. A drill-stem test from 4,289-98 ft. had showed 320 ft. oil.

Wilbarger County.—British-American Oil Producing Co. 1 Cora Wilkinson, Section 103, Waggoner Colony subdivision, was rigging up pump to test. After completing repairs, 4,000 ft. oil was found in the tubing, and after swab was run once, the well kicked off and flowed 55 bbl. in 30 minutes. It would not flow steadily, however, and will be put on the pump.

Jack County. — Final completion on Standard Oil Co. of Texas and Hanlon-Buchanan, Inc., 1 R. B. Peek, Section 3304, T.E.&L. Survey, wildcat northeast of Jermyn, shows a flow of 520 bbl. per day after 1,000 gal. acid treatment from 4,575-89 ft., in Caddo lime. Continental Oil 1 W. C. Weir, Kaltrider Survey, northwest of Jacksboro, appeared a failure in the deep zones after electrical survey was run to total depth 6,011 ft., and was running pipe to test a shallow sand at 2,327 ft. Youngblood & Foree 1 Fulcher, northeast of Post Oak, was fishing for drill pipe at total depth 6,164 ft.

Montague County: Simpson was topped in Stanolind Oil & Gas Co. 1 A. A. Cobb, Section 2830, T.E.&L. Survey, northwest of Bowie, at 6,751 ft., and the test had progressed to 6,902 ft. with only slight gas shows appearing in drilling mud on drill-stem test from 6,755-82 ft.

NORTH CENTRAL TEXAS COMPLETIONS

Wildcats

Clay County: Continental Oil and W. B. Omohundro 1 T. J. Stephens, 2,043 ft. from N, 1,347 ft. from E, G. W. Tipps Sur. A-449, flowed 483 bbl., 36 per cent water, pay 6,011 ft. lime, T.D. 6,049. Discovery.

Young County: Anderson-Pritchard and Col-Tex Ref. 1 Jennie Latimer, 815 ft. from N, 534 ft. from E, S 136 ac. of Sec. 17, Young County School Land, elev. 1,211 ft., I.P. 65 bbl., pay 3,635 ft., T.D. 3,645 ft. Discovery.

Anderson-Prichard and Darby Pet. 1 Henry Mooney, 517 ft. from S, 330 ft. from W, J. Mooney Sur., elev. 1,160 ft., Palo Pinto 1,623 ft., Caddo 3,499 ft., Barnett 4,432 ft., Ellenburger 4,696 ft., dry, T.D. 4,809 ft.

Fields

Archer County: Miller & Ward 3 S. B. Herron, Lot 12, C.&P. Sur., Blk. 15, pump 10 bl., pay 872 ft., T.D. 880 ft.

Clay County: F. H. Gohlke 1-B Paul Bilbrey, Blk. 27, Pratt's Pasture subd., dry, T.D. 1,353 ft.

Davenport, Montague County: Lesh & McCall 2 W. C. Henley est., 1,379 ft. from S, 330 ft. from E, G. W. Tilley Sur., elev. 911 ft., pump 12 bbl., perf. 2,434-48 ft., T.D. 3,016 ft.

Fargo, Wilbarger County: Humble Oil & Ref. 4 V. K. McCaleb, 440 ft. from N, 1,760 ft. from E, Sec. 34, Blk. 15, H.& T.C. Ry. Sur., elev. 1,378 ft., pump 160 bbl., pay 4,490 ft., T.D. 4,553 ft.

Holbert, Young County: Standard Oil Co. of Texas and Hanlon-Buchanan 2 N. G. Holbert, 1,400 ft. from S, 467 ft. from W, Sec. 726, T.E.&L. Sur., elev. 1,150 ft., dry, T.D. 3,870 ft.

Joy Mississippi, Clay County: Consolidated Oil 1 Viola Myers, 330 ft. from S, 3,555 ft. W, C. Thompson Sur., flow 12,096 bbl., 47 gravity, Mississippi lime pay 5,985 ft., T.D. 6,063 ft.

K.M.A., Wichita County: Grace & Grace 4 T. P. Dorris est., 3,474 ft. from SW cor., 800 ft. from E, Cowherd Bros. subd., J. R. Burrus Sur., I.P. 95 bbl., pay 4,033 ft., T.D. 4,096 ft.

K.M.A. Ellenburger, Wichita County: Staley Oil 6-E W. P. Ferguson, 340 ft. from N, 523 ft. from W, Blk. 2, F. Peterswick Sur., K.M.A. 3,845 ft., Ellenburger 4,295 ft., dry, T.D. 4,350 ft.

North Knox, Young County: Ray Oil & James P. Nash 5 King & Wooten, 1,775 ft. from W, 660 ft. from S, Sec. 1976, T.E.&L. Sur., elev. 1,223 ft., flow 706 bbl., pay 4,158 ft., T.D. 4,270 ft.

Portwood, Baylor County: Consolidated Oil 14-D W. H. Portwood, Sec. 1587, T.E. &L. Sur., salt-water injection well, T.D. 2,140 ft.

Scotland, Archer County: Shell Oil 1-E W. M. Coleman, 990 ft. from N and E, Lot 4, Blk. 74, A.T.N.C.L. subd., elev. 1,030 ft., dry, T.D. 5,276 ft.

Sewell, Young County: Henry Zweifel 1 R. L. Martin, J. Gates Sur. A-111, dry, T.D. 2,560 ft.

Wichita County: Cochran & Cain 2-A W. T. Waggoner est., 330 ft. from N and W 80-ac. lease, Sec. 14, H.T.&B. Sur., elev. 1,189 ft., I.P. 45 bbl., pay 1,864 ft., T.D. 1,892 ft.

Young County: Dorian & Mitchell 2-C B. Daniels, 467 ft. from N, 1,449 ft. from W, Sec. 420, T.E.&J. Sur., dry, T.D. 4,544 ft.

Anzac Oil 1-D A. P. Martin, 660 ft. from S, 685 ft. from W, George Cothran Sur., dry, T.D. 3,473 ft.

Wildcat

Jack County: Standard Oil Co. of Texas and Hanlon-Buchanan 1 R. B. Peek NE S½ Sec. 3304, T.E.&L. Sur., flow. 520 bbl., Caddo lime pay 4,575 ft., acid 1,000 gal., T.D. 4,589 ft., Discovery.

DAILY AVERAGE PRODUCTION FOR WEEK

	June 5 crude oil	June PAW quota all oils	May 29 crude oil
Arkansas	73,015	72,800	72,900
California	772,750	823,300	762,250
Colorado	5,855	7,000	6,475
Eastern fields	101,650	111,500	102,600
Illinois	213,600	246,200	219,650
Indiana	15,100	15,500	14,200
Kansas	271,050	300,000	299,450
Louisiana	332,055	330,800	348,000
North Louisiana	*85,505*	.....	*87,000*
Louisiana	*246,550*	.....	*261,000*
Michigan	57,900	58,900	58,100
Mississippi	54,240	50,000	54,000
Montana	21,000	22,300	21,450
Nebraska	2,150	2,400	2,100
New Mexico	101,400	105,700	97,850
Oklahoma	328,750	373,500	323,250
Texas	1,499,200	1,602,000	1,502,500
East Texas	*336,200*	.....	*339,300*
West Texas	*228,300*	.....	*226,700*
North Central Texas	*131,800*	.....	*131,750*
East Central Texas	*123,750*	.....	*124,300*
Texas Panhandle	*90,400*	.....	*91,200*
Texas Gulf Coast	*513,800*	.....	*514,000*
Southwest Texas	*74,950*	.....	*75,250*
Wyoming	96,880	97,000	97,240
Total United States	3,946,595	4,218,900	3,982,015
Total production Jan. 1-June 5, 1943			609,736,630 bbl.
Same period last year			594,239,045 bbl.

WEST CENTRAL TEXAS

ABILINE, Tex.—Drilling & Exploration Co. et al 1 Gibson, deep test 3½ miles southeast of Merkel in Taylor County, which had showed oil in Caddo lime from 5,135-52 ft., acidized with 1,000 gal. and had only slight show of oil and water, and was drilling below 5,175 ft. to test the Ellenburger. Verdict is due on Humble Oil & Refining 1 A. J. Willingham, Fisher County wildcat located in Section 43, Block 3, H.&T.C. Ry. Survey, 9 miles southwest of Rotan. At last report the well had drilled to 6,175 ft. Three miles southeast of this test, Hunter & Hunter 1 Fullingim, Section 112, Block 3, H.&T.C. Ry. Survey, was drilling ahead below 4,350 ft. in lime and shale, no shows reported. New wildcat location for Taylor County is Fain & McGaha 1 Homer Patterson, 990 ft. from west, 330 ft. from south lines of Lot 22, League 148, De Witt County School land. It is to go to 2,600 ft., testing the producing pays down to the Swastika sand.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Jones County: Hunter & Hunter 1 Minter est., 660 ft. from S and E, Sec. 41, Blk. 2, S.P.R.R. Sur., dry, T.D. 3,505 ft.

Comanche County: P. S. Groginski 1 Ira L. White, Blk. 29, Lampasas County School Land, dry, T.D. 665 ft.

Fields

Avoca, Jones County: Jones & Stasney 1 C. E. Youngquist, 990 ft. from S, 330 ft. from W, Sec. 189, B.B.B.&C.R.R. Sur.,

(Continued on Page 106)

CALIFORNIA

Pleasant Valley Extended to North, Dry Hole on West

LOS ANGELES, Calif. — Development work in the Pleasant Valley field of Fresno County this week changed expectations regarding the probable trend and areal scope as Standard Oil Co. defined the western limits of production with a dry hole and R. S. Lytle extended the northern limits of production by completing No. 88-20-F, 990 ft. north of the discovery well, flowing 1,195 bbl. daily from the equivalent of the Gatchell zone of Eocene with bottom of the hole at 9,052 ft. Thus the axis of the structure shows a probable northwest-southeast trend instead of an east-west trend as was expected and which appeared probable from the interpretation of the seismograph survey. That the field extends from northwest to southeast is further indicated by abandonment of Standard 62-29-F Pleasant Valley in 29-20s-16e, as this well was lower than the discovery well and failed to show commercial production.

Sand condition.—In work done to date it has been found that the top of the productive interval is too tight to produce and that the bottom of the zone, on the other hand, is quite conducive to large production. That the grading of the sand will become of paramount importance was further indicated by the inability of Standard to develop commercial production in No. 62-29-F which was abandoned this week despite a bottom-hole pressure initially of 5,500 lb. Present indications point to the probability the Pleasant Valley field will be relatively small although 1 mile intervenes between the southern end of the Coalinga Nose field and several miles between Pleasant Valley and the northern end of the Kettleman North Dome field to the southeast. Lytle's dry hole in the SE cor. 28-20s-16e, at 11,586 ft., definitely precludes the development of production southeastward to this point unless this hole is eliminated by faulting. Actual structural conditions at Pleasant Valley remain to be determined but it is quite possible this may be another shore-line accumulation laid down simultaneously with the Coalinga Nose area and subsequently fractured and separated by faulting.

Fresno County.—Union Oil Co. failed to find commercial production in the Eocene along the east side of the West Coalinga field and has abandoned 77-8 Coalinga fee in 8-20s-15e, at 6,604 ft. This deep test topped the Kettleman sand at 3,326 ft., the Big Blue at 3,373 ft., the Temblor at 3,640 ft., the Kreyenhagen at 4,188 ft., and the Eocene at 5,527 ft. Despite this dry hole, Standard is moving south and will drill a deep test in 17-21s-15e, in an attempt to develop Eocene production which might be comparable with similar production in the Coalinga Nose and Kettleman North Dome fields. Seaboard has location staked for a wildcat to be drilled west of the Raisin City field in 14-15s-17e, and General Petroleum has spudded in 81-9 Sopach in 9-17s-17e, near Towne on acreage leased from Southern Pacific.

Gas fields.—Texas has found the lower gas zone wet in the Mendota gas field and 14-16 Gill in 16-13s-16e, has been completed in the upper zone. No gage has yet been made. This well, the second to be drilled by Texas since discovery of the field, was carried down to 5,909 ft., plugged to 4,500 ft. and gun-perforated at 4,485-4,500 ft. The intermediate zone which was found to have a little oil present in the discovery well likewise proved unproductive. Wildcats drilled in search of commercial gas production showed a high mortality this week as Richfield abandoned its second well on the Natomas property and Bankline abandoned 2-1 Community in the Lodi area.

Kern County.—Development work in proved fields in San Joaquin Valley continues at an aggressive pace but a shortage of material, especially production equipment, may slow up drilling later in the year despite the adoption of some methods that will make equipment available for some operators who are able to estimate what they will need 3 or 4 months ahead. Independent operators feel that this material should be made available to any operator even though he is unable to estimate requirements that far ahead.

SAN JOAQUIN VALLEY COMPLETIONS

Belridge, South, Kern County: Shell 111-12 F.K.L., 12-29s-21e, dry in gray shale, T.D. 1,302 ft., oil sand topped at 978 ft. was wet.

Shell 73-12 F.K.L., 12-29s-21e, pumped 141 bbl., 13.6°, 11 per cent cut, T.D. 1,130 ft., perf. 980-1,045 ft., 1,075-1,128 ft., South Belridge zone of Pliocene age.

Coalinga, East, Fresno County: Shell 177-26 fee, 26-19s-15e, pumped 233 bbl., 20.9°, 1.2 per cent cut, T. D. 3,477 ft., perf. 3,205-45 ft., 3,445-75 ft., East Coalinga zone of Miocene age.

Shell 156-29 fee, 29-19s-15e, pumped 118 bbl., 20.3°, 1.5 per cent cut, T.D. 2,218 ft., perf. 2,125-2,214 ft.

Standard 230-35-A fee, 35-19s-15e, pumped 22 bbl., 23.2°, 15 per cent cut, T.D. 3,507 ft., P.B. 3,450 ft., perf. 3,325-47 ft.

Coalinga, West, Fresno County: Texas 2-A, 6-20s-15e, pumped 60 bbl., 12.4°, 30 per cent cut consisting of sand, T.D. 1,410 ft., P.B. 1,362 ft., perf. 1,337-55 ft., West Coalinga zone of Pliocene age.

Union Oil Co. 77-8 Coalinga fee, 8-20s-15e, dry in gray sand, T.D. 6,604 ft., Kettleman sand 3,326 ft., Big Blue 3,373 ft., Temblor 3,640 ft., Kreyenhagen 4,188 ft., Eocene 5,527 ft., Moreno sand 5,729 ft.

Elk Hills, Kern County: U. S. Navy 65-1-G, 1-31s-24e, pumped 56 bbl., 19.8°, 6 per cent cut, T.D. 3,415 ft., P.B. 3,300 ft., Tupman one of Pliocene age.

U. S. Navy 21-34-S, 34-30s-24e, pumped 524 bbl., 20.4°, 0.2 per cent cut, T.D. 3,138 ft., perf. 3,065-3,135 ft.

Helm, Fresno County: Amerada Pet. Corp. 4-26-F Gunn, 26-16s-17e, dry, T.D. 8,500 ft.

Amerada 21-8-F Wheatville Ranch, 8-17s-18e, flowed 265 bbl., 37.2°, 0.2 per cent cut, 450,000 cu. ft. gas, T.D. 8,233 ft., perf. 8,000-15 ft., Helm zone of Miocene age.

Kern Front, Kern County: Standard 46-15 fee, 15-28s-27e, pumped 43 bbl. net, 13.7°, 41 per cent cut, T.D. 2,284 ft., perf. 2,024-2,284 ft., Kern Front zone of Pliocene age.

Westates Pet. Corp. 44 Cauley, 16-28s-27e, pumped 163 bbl., 15°, 7 per cent cut, T.D. 2,975 ft., perf. 2,862-2,975 ft.

Lodi wildcat district, San Joaquin County: Bankline Oil Co. 2-1 Community, 12-4n-6e, dry in basement rocks, T.D. 5,707 ft., Iona sand 2,545 ft., Capay shale 2,633 ft., Cretaceous silt 4,497 ft., Cretaceous white sand 5,367 ft., basement 5,682-5,707 ft.

McKittrick, Kern County: East Puente Oil Co., 2-4-A, 11-30s-21e, pumped 35 bbl., 13.4°, 5 per cent cut, T.D. 1,249 ft., 200 mesh perf. 1,109-1,249 ft., McKittrick zone of Pliocene age.

Mendota gas field, Madera County: Texas 14-16 Gill, 16-13s-16e, flow gas, shut in, T.D. 5,909 ft., P.B. 4,500 ft., perf. 4,485-4,500 ft., Gill zone of Miocene age.

Midway-Sunset, Kern County: C.C.M.O. Co., 58-9 fee, 9-32s-23e, pumped 25 bbl., 15.2°, 10 per cent cut, T.D. 3,030 ft., perf. 2,927-3,013 ft., Midway zone of Pliocene age.

Standard, 2-15-A fee, 15-31s-22e, pumped 26 bbl. net, 13.9°, 60 per cent cut, T.D. 1,440 ft., 615-750 ft., 1,130-1,300 ft.

Texas Co., 24-A M. S. Pool, 36-31s-22e, pumped 25 bbl. net, 20.4°, 85 per cent cut, 2,605 ft., perf. 2,269-2,609 ft.

Pleasant Valley, Fresno County: R. S. Lytle, 88-20-F, 20-20s-16e, flowed 1,195 ft., 29.3°, 0.5 per cent cut 800,000 cu. ft. gas, 24/64-in. bean, pressures 1,300/1,650 lb., T.D. 9,052 ft., perf. 8,810-9,038 ft., Temblor 5,940 ft., Kreyenhagen 7,260 ft., green sand 8,451 ft., in equivalent of Gatchell zone of Eocene age.

Standard, 62-29-F, Pleasant Valley, 29-20s-16e, dry, T.D. 9,055 ft., Temblor 5,935 ft., Felix silt 7,030 ft., Kreyenhagen 7,218 ft., green sand 8,459 ft., grit zone 8,465 ft., gray sand 8,500 ft., Eocene oil sand 8,947 ft.

Rio Vista gas field, Solano County: Peter Cook, 4 Rio Vista, 17-4n-3e, flowed 10,216,000 cu. ft. gas, no oil, 40/64-in. bean, pressures flowing 1,123/1,524 lb., shut in pressures 1,660/1,660 lb., T.D. 4,376 ft., perf. 4,275-76 ft., Emigh zone of Eocene age.

Round Mountain, Kern County: Honolulu Oil Corp., 41 Round Mountain, 18-28s-29e, pumped 31 bbl. net, 14.7°, 35 per cent cut, T.D. 1,860 ft., perf. 1,816-60 ft., Vedder zone of Miocene age.

Sacramento wildcat district, Sacramento County: Richfield, 2 Natomas, 28-10n-4e, dry, in hard gray sand, T.D. 3,746 ft.

Wheatville, Fresno County: Superior, 81-22 Kreyenhagen 22-17s-18e, flowed 130 bbl., 39.6°, 0.1 per cent cut, 865,000 cu. ft. gas, 8/64-in. bean, flow pressure completed in Miocene.

Orange County.—Signal Oil & Gas Co. has entered the Newport field west of D. W. Elliott's 1 Townsand Land discovery well which is at present pumping 50 bbl. daily from 2,400 ft. Signal's new well will be drilled on the Willow Community lease in 19-6s-10w and is considered as being within or close to the outer limits of commercial production. This old field which has been drilled and tested at frequent intervals over a 25-year span is California's newest hot spot although operators recognize the prob-

(Continued on Page 108)

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APPALACHIAN FIELDS

Oriskany Test Started in Gilmer County, W. Va.

PITTSBURGH, Pa. — In Center district, Gilmer County, Hope Natural Gas Co. has commenced an Oriskany test on the Susan Stump farm on the Glenville quadrangle, located 5 miles south 38° 55′ and 3.85 miles west 80° 55′, elevation 797 ft. The drilling had reached a depth of 14 ft. where a string of 16-in. casing has been set.

In Dry Fork, Tucker County, Ohio Oil Co. is drilling at 5,090 ft. in the test on the Kaemmerling tract.

WEST VIRGINIA COMPLETIONS

Boone County, Washington district: South Penn Natural Gas Co. 74 Yawkey-Freeman, 350,000 cu. ft. gas, 2 bbl. oil, Big lime 2,008 ft., Berea 2,696 ft., T.D. 2,737 ft.

Owens, Libby-Owens 659 C. A. Croft, 117,000 cu. ft. gas after shot, Berea 1,939 ft., T.D. 1,981 ft.

Clay County, Henry district: Virginian Gasoline & Oil Co. 1337 Brown-Goshorn-Swan, dry, T.D. 1,999 ft.

Gilmer County, De Kalb district: South Penn Natural Gas Co. 6 S. M. Hardman, 2 bbl., Weir sand 1,667 ft., T.D. 1,715 ft.

Troy district: A. E. Ellis 1 J. J. Flesher, 145,000 cu. ft. gas, Big Injun, T.D. 1,805 ft.

Kanawha County, Big Sandy district: Falling Rock Producing Co. 113 fee, 100,000 cu. ft. gas, Big Injun, T.D. 2,049 ft.

Lincoln County, Duval district: South Penn Natural Gas Co. 1 Austin Griffin, 2,055,000 cu. ft. gas, Berea, T.D. 4,317 ft., P.B. 2,306 ft.

United Fuel Gas Co. 5211 Hill & Ashby, 267,000 cu. ft. gas, brown shale, T.D. 3,913 ft.

Upshur County, Banks district: Hanly & Bird 1 W. F. Armstrong, 98,000 cu. ft. gas, Gordon, T.D. 2,187 ft.

Cumberland & Allegheny Gas Co. 339 G. W. Samples, 756,000 cu. ft. gas, stray and Gordon, T.D. 2,128 ft.

Meade district: Cumberland & Allegheny Gas Co. 337 Libbie Allman, 50,000 cu. ft. gas, Gordon, T.D. 2,200 ft.

SOUTHWEST PENNSYLVANIA

Westmoreland County.—On Laurel Ridge in Ligonier Township, Westmoreland County, New Penn Development Co., William E. Snee et al reached a depth of 8,220 ft. in 1 John and Eleanor Beck well when the tools stuck. On Chestnut Ridge, in Derry Township, Peoples Natural Gas Co. is drilling at 3,715 ft. in 1 Camilla Giffin.

Beaver County.—In Ohio Township South Penn Oil Co. is drilling at 420 ft. in the Oriskany test on the Cunningham-Vlatovich unit.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Armstrong County, Boggs Township: Peoples Natural Gas Co. 1 Watring, 50,000 cu. ft. gas, Murraysville and Hundredfoot, T.D. 2,540 ft.

Greene County, Jefferson Township: Equitable Gas Co. 1 Effie Bonnell, dry, Bayard 3,050-76 ft., T.D. 3,154 ft.

Richhill Township: D. G. Braddock 6 Newton Braddock, 50,000 cu. ft. gas, Fourth 2,608-19 ft., gas 2,610 ft., T.D. 2,670 ft.

EASTERN TEXAS

Hawkins Failure to Be Carried to Paluxy

DALLAS, Tex.—Bracken Oil Co. 1 Boger, Woodbine sand failure for the Hawkins pool at total depth 4,995 ft., was preparing to drill deeper to test the Paluxy sand from which three other Wood County pools produce. The well was plugged back to 4,910 ft., and a drill-stem test failed to show any oil from 4,880-4,910 ft. Northeast of Quitman, Fisher & Jackson 1 McCarley, scheduled Paluxy test, was showing good gas and distillate odor from Woodbine sand, after salt water showed in the Sub-Clarksville horizon. A core from 5,390-99 ft. showed slight porosity in ashy sand, and another core from 5,399-5,419 ft. recovered 8 ft. hard greenish siltstone and 6 ft. hard sand with thin streaks of shale, with good gas odor and slight salty taste.

Panola County.—Union Producing Co. 1 Black, C. Black Survey, Carthage area, showed slight stains of oil in a core taken from 6,221-35 ft., and is drilling below 6,350 ft. Continental 1 Louis Werner Sawmill Co. was believed to be in the Travis Peak formation in drilling and coring below 6,205 ft. Roger Lacy 1 Burnett Brothers, which showed for some kind of a producer in the Rodessa zone, was drilling below 5,955 ft.

Henderson County.—Stanolind Oil & Gas 1-D Tri-Cities Unit, Wiley Kay Survey, 6 miles southwest of Athens, is making about 2,000,000 cu. ft. of gas per day while testing at 8,591 ft. Same company's 1-B Tri-Cities Unit, James Rice Survey, plugged back to 7,714 ft., flowed 57.1 bbl. distillate through open 8-in. tubing, with 2,000,000 cu. ft. gas.

Kaufman County.—Sun Oil Co. 1 J. M. Rutledge, in the Parsons Survey of northeast part of the county, deep test on the fault zone, is drilling below 6,340 ft.

EAST TEXAS COMPLETIONS

Wildcats

Franklin County: Tide Water and Seaboard 1 A. J. Bacon, 440 ft. from N and E, 123-ac. tract, Maximillian Sur., elev. 4,351 ft., flow 208 bbl. from Travis Peak pay, 7,902 ft., flow 348 bbl. from Rodessa pay, perf. 7,295-7,305 ft., T.D. 8,089 ft. Discovery, New Hope field.

Nacogdoches County: The Texas Co. 1 G. W. Strahan, 990 ft. from S, 660 ft. from W, 110-ac. tract, Ariola Sur., elev. 447 ft., flow 28 bbl. distillate, 25,000 cu. ft. gas, perf. 8,610-60 ft., Travis Peak pay, T.D. 9,295 ft. Discovery.

Wood County: Amerada Pet. 1 G. A. Turner, 467 ft. from S and W 51-ac. tract, Ogden Sur., elev. 497 ft., Paluxy 6,370 ft., Massive anhydrite 7,770 ft., Travis Peak 8,525 ft., dry, T.D. 8,901 ft.

Fields

Kildare, Cass County: The Texas Co. 1 Berry Davis, 1,553 ft. from N, 467 ft. from E, B. W. Hopson Sur., elev. 225 ft., flow 196 bbl., pay 5,998-6,007 ft., P.B. to 6,008 ft. from T.D. 6,040 ft.

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KANSAS

Ellis County Wildcat Running High on Arbuckle

AN important wildcat on the Bemis-Shutts trend of Ellis County, about 4 miles southwest of the pool, was reported to be running high on the Arbuckle with the drill going directly into the lime. There was no conglomerate zone. The well is Carl Lebsack and H. E. Alexander's 1 Jansen, SE SE NE 3-13-18w, in Ellis County. Operators drilled 8 ft. in the Arbuckle at 3,668 ft., which had good saturation, and set 5-in. casing to 3,672 ft. A show of oil was also found in the Lansing lime. Formation tops were: Topeka 3,135 ft., Lansing 3,422 ft. and the Arbuckle at 3,672 ft. Gulf Oil Corp. and Cities Service Oil Co. are owners of offset locations to the wells.

KANSAS COMPLETIONS

Wildcats

Barber County: Olsen Oil 1 Swartz, SW NE 6-32-11w, dry, T.D. 4,312 ft., Douglas sand 3,383 ft., Mississippian lime 4,260 ft.

Barton County: Stanolind 1 Nairn, SW SW SW 35-19-15w, dry, T.D. 3,758 ft., Lansing 3,292 ft., conglomerate 3,590 ft., Arbuckle 3,658 ft.

Ohio Oil 1-A Kraft, NE NE SW 26-16-11w, dry, T.D. 3,458 ft., Lansing 3,057 ft., Arbuckle 3,418 ft.

Brown County: Clifton Gall & Towle, SW SW 18-3-17e, dry, T.D. 2,732 ft., Lansing 901 ft., Mississippi lime 2,183 ft., Hunton 2,668 ft.

Ellis County: Schermerhorn Oil Corp. 1 Leiker, NW SW SE 17-15-17w, dry, T.D. 3,630 ft., Lansing 3,298 ft., Arbuckle 3,598 ft.

Marion County: Alco Valve 1 Vogel, E½ SE SE 32-19-3e, dry, T.D. 2,955 ft., Lansing 1,910 ft., Mississippian chat 2,461 ft., Viola 2,814 ft., Simpson 2,880 ft., Arbuckle 2,944 ft.

Osborne County: Northern Ordnance 1 Vandament, NW NW 3-9-13w, dry, T.D. 4,125 ft., Lansing 3,022 ft., Mississippi lime 3,632 ft., Hunton 3,751 ft., Viola 3,776 ft., Simpson 4,019 ft., Arbuckle 4,070 ft., small show oil 3,055 ft.

Rice County: Phillips Pet. 1 Matthaei, SE SE SW 19-18-9w, dry, T.D. 3,273 ft., Lansing 2876 ft., Arbuckle 3,243 ft.

Russell County, N extension to Hall-Gurney: Hartman & Blair 1 Sam Boxberger, SW SW SE 10-14-14w, pumped 108 bbl., cut 20 per cent, Gorham 3,264-67 ft.

Stafford County: W. P. Faulkner 1 Walter, N½ NE NE 18-21-13w, dry, T.D. 3,777 ft., Lansing 3,396 ft., Arbuckle 3,727 ft.

Fields

Beaver, Barton County: Darby Pet. 1 Staudinger, S½ SE NW 8-16-12w, dry, T.D. 3,349 ft., Lansing 3,079 ft.

Boyd, Barton County: Phillips Pet. 1 Hickey, SE SE NW 33-17-14w, dry, T.D. 3,436 ft., Arbuckle 3,394 ft.

Carmi, Pratt County: Magnolia 2 Binger, SW NE NE 31-26-12w, flowed 22 bbl. an hr., Arbuckle 4,291-4,314 ft.

Crowther, McPherson County: Westgate-Greenland 1-A Crowther, S½ NW NE 26-17-1w, pumped 128 bbl., Mississippian chat 2,809-28 ft.

Cunningham, Pratt County: Deep Rock 1 Bowers, E½ SE SE 34-27-11w, pumped and flowed 471 bbl., Lansing 3,482-95 ft., T.D. 4,132 ft.

Drach, Stafford County: Stanolind 4 Harms, NW NW 18-22-12w, pumped 369 bbl., Arbuckle 3,686-91 ft.

Stanolind 5 Harms, N½ NE NE 18-22-12w, swabbed 11½ bbl. an hr., Arbuckle 3,681-87 ft.

Hall-Gurney, Russell County: Jones & Shelbourne 2 Hupfer, SE NE NW 31-14-12w, potential 851 bbl., Gorham 3,111-17 ft.

Haverhill, Butler County: Cromwell & Lewis 1 Reetz and Skaer, SW NW SW 35-27-5e, pumped 15 bbl., Viola 3,097-3,101 ft.

Kraft-Prusa, Barton County: Sinclair Prairie 5 Schmitt, NE NW NW 20-16-11w, pumped 498 bbl., Lansing 3,204-10 ft., T.D. 3,427 ft.

Magnolia 3 Grosshardt, SE SW 9-17-11w, swabbed 30 bbl. an hr., Arbuckle 3,269-73 ft.

Cities Service 5-A Hogan, NE NW NE 11-17-11w, pumped 455 bbl., Arbuckle 3,374-93 ft.

Lost Springs, Marion County: Loriaux & Harrington 3 Honska, SW NE 5-18-4e, pumped 255 bbl., Mississippian chat 2,406-26 ft.

McLouth, Leavenworth County: Magnolia 1 Tullis, SW SW SE 22-9-20e, dry, T.D. 1,421 ft.

Orth, Rice County: Transwestern Oil 1 Zink, NE SW 22-18-10w, dry, T.D. 3,300 ft., Arbuckle 3,257 ft.

Peace Creek, Reno County: Magnolia 1 Johnson, SW NE SW 32-23-10w, pumped 130 bbl., Viola 3,674-15 ft.

Cities Service 1 Morgan, SW NW SW 6-23-9w, pumped 90 bbl., Viola 3,720-49 ft.

Silica, Rice County: Shasta Oil Corp. 1-A Flora, SE SE SW 26-19-10w, dry, T.D. 3,323 ft., Arbuckle 3,309 ft.

Stoltenberg, Ellsworth County: Nate Appleman 1 Harbacek, E½ SW NE 7-16-10w, pumped 123 bbl., Arbuckle 3,300-22 ft.

McCullough & Dawson 1-A Herejsi, NW NE 17-16-10w, pumped 350 bbl., Arbuckle 3,357-65 ft.

Trapp, Russell County: Cities Service 6-A Krug, SW SW NE 24-15-14w, potential 1,007 bbl., Arbuckle 3,349-52 ft.

Witt, Russell County: Stanolind 1 Boxberger, SW NW NW 10-14-14w, pumped 585 bbl., Lansing 2,999-3,004 ft., 3,015-26 ft., T.D. 3,241 ft.

Coralena Oil 2 Krug, SW NE SE 4-14-14w, pumped 359 bbl. in 8 hr., Lansing 2,977-3,007 ft.

Zenith, Reno County: Skelly 1 Johnson, SE SW 31-23-10w, pumped 174 bbl., Viola 3,707-25 ft.

NEBRASKA

ST. JOSEPH, Mo.—The Nebraska Producing & Refining Co. has drilled below 1,550 ft. in its 1 D. E. Bohrer well in the Dawson pool of Richardson County, Nebraska, and was expecting to encounter Hunton lime pay soon. This is one of two wells on schedule this spring for the NW 10-1n-14e, in proven territory. The surface pipe was set at 314 ft.

NEBRASKA COMPLETION

Furnas County: C. W. Trickett 1 Gossci, NW NW NW 33-2n-21w, dry, T.D. 3,723 ft.

ROCKY MOUNTAIN

Horse Creek Discovery Well Successfully Recompleted

DENVER, Colo.—General Petroleum Corp. discovery well on the Horse Creek structure, Laramie County, Wyoming, on the northwest rim of the Denver basin, which came in last fall with promise of opening a new pool of considerable importance only to turn mostly to water, has been restored as a producer. The well, 78-31-G, SW SE SE 31-17n-68w, was completed in the Lakota sand at 5,530 ft., and pumped 580 bbl. initial. On an official gage, however, it showed 500 bbl. gross, 20 per cent basic sediment and water. Then the water increased to about 80 per cent of the total fluid. In the meantime the rig was moved south and another well was drilled, and although it was a small producer in the Muddy sand, it proved to be a disappointment. The rig then was moved to the north side to test out the area in that direction and is about ready to spud. While preparations were under way for drilling the third well, tools were moved back to the discovery, hole was cleaned out and plugged back slightly. This proved partially successful and most of the water has been shut off. No test on the pump has been made, however, as storage is full and the well is shut in waiting on transport facilities for moving the oil to the Frontier refinery at Cheyenne.

WYOMING COMPLETIONS

Cole Creek, Natrona County: General Petroleum Corp. 73 Government, NW SE NE 21-35n-77w, T.D. 4,562 ft., Shannon sand 4,525 ft., pumped 80 bbl.

Lance Creek, Niobrara County: Continental Oil Co. 8 Apex-1, NW NW NE 34-36n-65w, T.D. 5,401 ft., swabbed 156 bbl. in 24 hr. from the Leo after acid.

MONTANA COMPLETIONS

Cut Bank, Glacier County: Trigood Oil Co. 3 Tribal-230, SE NE SW 29-32n-5w, T.D. 2,880 ft., no Sunburst sand, upper Cut Bank 2,843-50 ft., dry, no lower Cut Bank, plugged and abandoned.

Frances Oil Co. 1 Ward, SE SW NW 32-36n-5w, T.D. 3,060 ft., show of oil in Sunburst at 2,950-65 ft., Cut Bank 2,984-3,045 ft., show of oil at 3,000 ft., 600 ft. of water at 3,010-45 ft., dry.

Prevol & Shay 13 Wait, NW NW NE 13-35n-2w, T.D. 1,446 ft., Ellis-Madison 1,523-27 ft., acid., 20 bbl.

Nepstad, Montgomery, Fargher 5 Haugen, NE SW SE 2-35n-2w, T.D. 1,866 ft., Ellis-Madison 1,846-66 ft., 15 bbl., acid.

A. E. Crumley & Son 26 Fryberger, NW SW SE 24-35n-3w, T.D. 1,610 ft., P.B. to 1,590 ft., Ellis-Madison 1,562-90 ft., acid., 2 bbl. oil and 10 bbl. water.

North Cut Bank failure. — Frances Oil Co. 1 Ward, SE SW NW 32-36n-5w, 2 miles due north of the Glacier Production Co. 1 McGuinness unit, which averaged 700 bbl. daily on a 10-day test last fall, proved to be a failure and was abandoned upon finding only a show of oil in the Sunburst and a small show in the Cut Bank sand, followed by water. The McGuinness well is on the west side of the Cut Bank gas field and 2½ miles east of the nearest oil producer. The Ward well was drilled in an attempt to discover the trend of production shown in the McGuinness well. M. R. Wagner 1 Pierce, ½ mile southeast of the Ward well also missed the pay when completed last April.

Pilot Butte outpost flows. — The British-American Oil Producing Co.

(Continued on Page 106)

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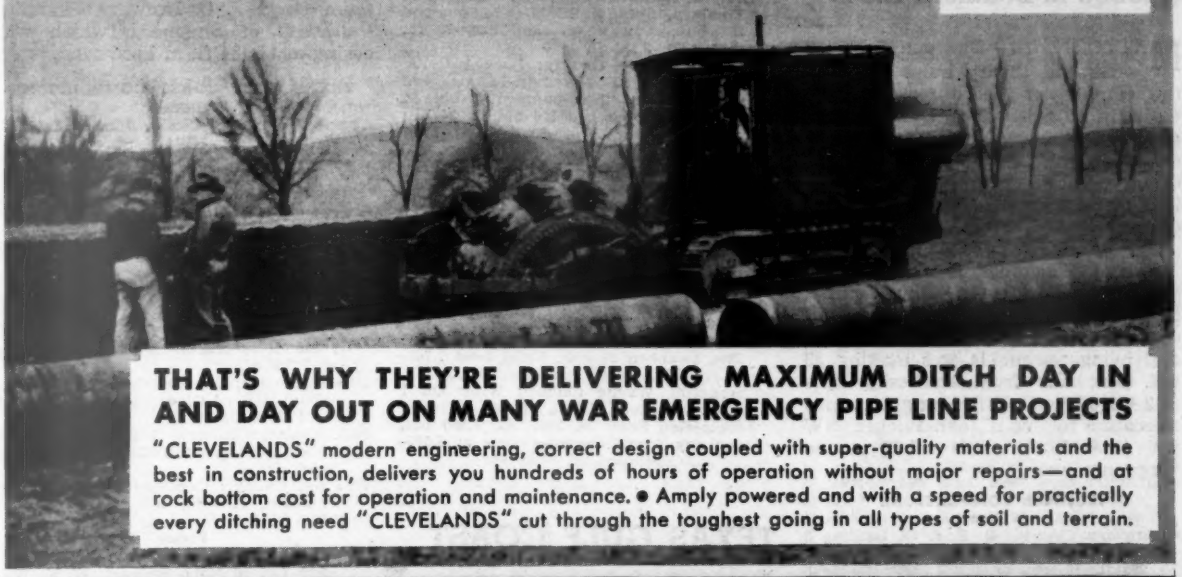

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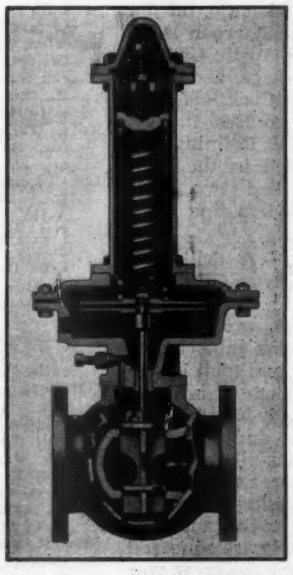

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ILLINOIS

Two New Productive Spots Opened in Southern Areas

MATTOON, Ill.—Thirteen new oil wells and 12 dry holes made up the completion record for the past week in Illinois. Two wildcats, one in Wayne County and one in White County opened pools, but the Wayne County discovery was a 15-bbl. initial producer while the test in White County started at 62 bbl. with some water per day.

Leland Waggoner 1 John Pilcher, SW NW 13-5n-5e, in Clay County, reported last week as a pool opener or an extension to the Iola pool was still being tested. It was making 33 bbl. per hour from McClosky lime at 2,461-66 ft. Gulf Refining Co. made a location for No. 1 John Pilcher, NW SW 13-5n-5e, a south offset to the Waggoner well.

ILLINOIS COMPLETIONS

Wildcats

Champaign County: R. F. & G. Drilling 3 Reynolds, NE SW NE 1-22n-7e, dry at 295 ft.

Clinton County: Eason-Moulton 1 Breese Bank, NW SW SW 36-3n-4w, dry at 1,097 ft., Golconda 826 ft., Cypress 940 ft., Benoist 1,066 ft.

Mason County: P. Steinberger 1 Null, SE SW NW 19-22n-6w, dry 1,401 ft., Devonian lime 885 ft.

Wabash County: Olds Drilling 1 Landis Zimmerman, 2,640 ft. from N and 2,480 ft. from W lines 9-1s-12w, dry at 2,411 ft., Buhl at 1,470 ft., Waltersburg 1,677 ft., Vienna 1,703 ft., Glen Dean 1,795 ft., Golconda 1,894 ft., Barlow 1,994 ft., Cypress 2,013 ft., Paint Creek 2,123 ft., Benoist 2,162 ft., Renault 2,211 ft., Ste. Genevieve 2,271 ft., McClosky 2,339 ft., St. Louis 2,378 ft.

Washington County: H. Detrick 1 Mossman, C W½ NW NE 20-2s-5w, dry 1,208 ft., Ste. Genevieve 1,063 ft., St. Louis 1,206 ft. (tops estimated).

Wayne County: Burr Lambert et al 1 E. A. Fitch, SE SW SE 12-1n-9e, pumped 15 bbl., Aux Vases sand 3,149-60 ft., shot, T.D. 3,367 ft., P.B. to 3,178. Pool opener.

Deep Rock 1 Toole, S½ NW NW 36-2s-7e, dry at 3,535 ft., Gonconda 2,882 ft., Barlow 2,984 ft., Cypress sand 3,004 ft., Weiler 3,046 ft., Paint Creek 3,129 ft., lower Renault 3,281 ft., Aux Vases 3,297 ft., Rosiclare 3,378 ft., Fredonia 3,425 ft., McClosky 3,436-41 ft. and 3,486-90 ft.

White County: Dee Miller Drilling 1 Coleman, NE SE SW 6-4s-11e, dry at 3,175 ft., Benoist at 2,839 ft., upper Renault 2,904 ft., lower Renault 2,939 ft., Ste. Genevieve 3,005 ft., Roisclare 3,047 ft., Fredonia 3,090 ft.

W. C. McBride, Inc. 1 Bayley, NW cor. SE SW SE 3-7s-9e, pumped 49 bbl. of oil and 5 bbl. water first day, then 62 bbl. of oil and 7 bbl. water on second day. Cypress sand 2,684-90 ft., shot at 2,686-2,702 ft., T.D. 3,125 ft., P.B. to 2,700 ft. Pool opener.

Magnolia 1 E. W. Pomeroy, SE NE NE 2-6s-10e, dry at 3,200 ft., Barlow at 2,676 ft, Cypress 2,685 ft., Paint Creek sand 2,853 ft., Aux Vases 2,972 ft., Ste. Genevieve 3,025 ft., McClosky 3,092-96 ft., and 3,098-3,109 ft.

Fields

Allendale, Lawrence County: C. F. Ross 1 E. Blair, SW NW SW 25-2n-12w, junked at 790 ft.

Smith & Nye 1 E. Ridgeley, SW SE NE 11-2n-12w, pumped 100 bbl., Benoist sand at 1,710-30 ft., shot, T.D. 1,868 ft., P.B. to 1,772 ft.

Bible Grove, Clay County: Texas 7 M. Bloemker, NW SE NW 3-5n-7e, pumped 105 bbl., Cypress sand 2,529-36 ft., T.D. 2,542 ft.

Blairsville, Hamilton County: Texas 1 R. D. Flanigan, SW SW SE 17-4s-7e, pumped 257 bbl., Aux Vases sand 3,264-78 ft., shot, T.D. 3,384 ft.

Clay City, Wayne County: Pure 1 C. A. Rosster, SE SE NW 2-1n-7e, swabbed 69 bbl. a day, then pumped 46 bbl. in 11 hr.; then pumped 116 bbl. in 24 hr.; Aux Vases sand 2,925-50 ft., T.D. 2,957 ft.

Coil, Wayne County: C. R. Ross 1 Gregory Morris, SE SE SW 18-1s-5e, old T.D. 2,955 ft., deepened to and dry at 3,070 ft., Aux Vases at 2,907 ft., Ste. Genevieve 2,960 ft., Fredonia 2,995 ft., McClosky 3,025-30 ft. and 3,062-66 ft.

Friendsville, Wabash County: W. E. Bailor 4 Liddle, SE NE SE 27-1n-13w, pumped 50 bbl. oil and 5 bbl. water, Biehl sand 1,760-68 ft., T.D. 1,772 ft.

W. E. Bailor 2 Michael, SE SE SE 27-1n-13w, swabbed 20 bbl., Biehl sand 1,746-59 ft., T.D.

Johnsonville, Wayne County: Wiser Oil 1 J. H. Matchett, C N½ SE NE 27-1n-6e, completed Sept. 16, 1941, for 9,300 bbl. per day from McClosky lime at 3,077-

(Continued on Page 94)

TEXAS GULF COAST

Wilcox Sand Test Started in Raccoon Bend field

HOUSTON, Tex.—A Wilcox sand wildcat test has been staked by Pan American Production Co. on the southwest flank of the Raccoon Bend Cockfield sand pool in Austin County. The well 1 Austin College, about 1¼ miles southwest of the Cockfield sand wells, is scheduled to go 9,500 ft. Two years ago Humble Oil & Refining Co., which owns every well in the Raccoon Bend field, drilled two deep Wilcox tests, but failed to find commercial production.

Matagorda County.—A drill-stem test conducted by Superior Oil Co. of California at its 1 F. B. Peterson, Sugar Valley prospect, produced 24 bbl. of distillate and the same quantity of brackish water and mud in one day. The test was made from perforations at 10,595-10,690 ft. with ⅝-in. bottom-hole choke and two 1-in. chokes at the top. Gas-oil ratio was 94,000. The well then was plugged back to 9,909 ft. Casing was perforated at 9,735-40 ft. and retainer set at 9,704 ft. Perforations were squeezed and at the latest report the crew was waiting for the cement to set. Stanolind Oil & Gas Co. 1 J. L. Pydus, southwest of Blessing, was coring at 7,640 ft. Boyle Oil Corp. has staked location for 1 Guy Stovall, wildcat test 5 miles northwest of Midfield.

Harris County.—Cities Service Oil Co. was getting ready to make another test of its 1 Witcher, 3 miles northeast of Alief, with casing perforations at 7,923-27 ft. Earlier tests yielded oil, gas and water. Sun was drilling at 4,840 ft. in shale at 1 Maggie Mansell, 2½ miles north of Katy.

San Jacinto County.—Little encouragement was reported from J. S. Abercrombie Co. and Magnolia Petroleum Co. 1 J. C. Brewer, 6½ miles southwest of Shepherd, which was coring at 11,434 ft. in hard sand.

TEXAS GULF COAST COMPLETIONS

Wildcats

Chambers County: Cox & Hamon 1 W. C. Tyrrell, 5 mi. NW of Stowell, dry at 8,705 ft.

Rowan & Nichols Oil Co. 1 W. H. Land, S. P. Donley Sur., 155,000,000 cu. ft. gas and 49 bbl. condensate per 1,000,000 cu. ft. gas, open flow, perf. 9,003-30 ft. and 9,017-37 ft., T.D. 9,195 ft., P.B. 9,037 ft. Gas discovery.

Jackson County: Forest Development Co. 1 Felix L. Frank, 1½ mi. NE of La Salle, dry at 6,003 ft.

Salt Dome Oil Corp. 1 T. N. Mauritz et al, 1 mi. N of North La Ward field, dry at 7,819 ft.

Liberty County: Ohio Oil Co. 1 B. E. Quinn, 4½ mi. NE of Cleveland, dry at 10,310 ft., P.B. 8,934 ft.

Polk County: Humble 1 J. C. Whitforth et al, Livingston field area, dry at 11,023 ft.

Wharton County: Continental 1 Louisa G. Peterson, J. Villa Sur., A-315, dry at 5,542 ft.

Fields

Dickinson, Galveston County: Coast Petroleum Co. 16 Maco Stewart, W. K. Wilson Sur., A-208, O.W.W.O., old T.D. 8,932 ft., new P.B. T.D. 8,493 ft., 151 bbl. through ¼-in. by 6-in. chokes, T.P. 1,100 lb., gas-oil ratio 1,875, perf. 8,478-86 ft.

Frank W. Bennett 4 W. G. Way, P. G. Merritt Sur., A-115, O.W.W.O., old T.D. 8,129 ft., new P.B. T.D. 7,942 ft., 25 bbl. distillate through 14/64-in. choke, T.P. 1,275 lb., gas-oil ratio 40,000, perf. 7,920-40 ft.

Esperson, Liberty County: General Crude Oil Co. 13 Moores Bluff Corp., M. Duncan Sur., A-29, O.W.D.D., old T.D. 4,122 ft., new T.D. 5,707 ft., completed as salt-disposal well.

Katy, Waller County: Humble 1-D American Rice Milling Co., H.&T.C. Sur., dry at 7,925 ft.

Lovell Lake, Jefferson County: Humble 5-B B. A. Steinhagen, A. O. Donnell Sur., A-115, O.W.W.O., old T.D. 7,792 ft., new P.B. T.D. 7,782 ft., 275 bbl. through ¼-in. by 6-in. chokes, T.P. 400 lb., C.P. 1,400 lb., gas-oil ratio 613, perf. 7,777-81 ft.

North Markham, Matagorda County: Ohio Oil Co. 18 J. C. Carlson, I.&G.N. Sur., A-329, 223 bbl. through ⅛-in. choke, T.P. 1,200 lb., C.P. 1,350 lb., gas-oil ratio 471, perf. 7,715-18 ft., T.D. 9,010 ft.

Old Ocean, Matagorda County: Harrison & Abercrombie 1-B R. D. McDonald, dual completion, from perf. 10,050-90 ft., 588 bbl. through ¼-in. tubing choke, T.P. 950 lb., gas-oil ratio 841; from perf. 9,620-50 ft., 300 bbl. distillate through ¼-in. casing choke, C.P. 2,300 lb., gas-oil ratio 36,947, T.D. 14,378 ft., P.B. 12,500 ft.

Stowell, Jefferson County: Glenn H. McCarthy, Inc., et al 3 B. P. Prox, B. A. Vacucu League, A-50, location and pits abandoned.

Phillips et al 1 Hankamer and Marrs McLean, L. Lopez Lge., A-37, O.W.W.O., dual completion, old P.B. T.D. 7,850 ft., new P.B. T.D. 7,872 ft., from perf. 7,836-46 ft., 343 bbl. through 9/64-in. choke, T.P. 1,275 lb., gas-oil ratio 566; from perf. 7,511-16 ft., 184 bbl. through 9/64-choke, C.P. 1,575 lb., gas-oil ratio 1,116.

West Mauritz, Jackson County: J. A. Gray 1 W. W. McCrory, M.&C. Sur., A-235, 205 bbl. through 9/64-in. choke, T.P. 475 lb., C.P. 850 lb., gas-oil ratio 340, perf. 5,492-95 ft., T.D. 5,700 ft.

OKLAHOMA

Sand Discovery in Creek County Is Flowing Well

INTEREST of Oklahoma drillers centered in a Dutcher sand discovery in Creek County, a large flowing well on the northwest side of Pauls Valley and the sale of the new West Delaware pool near Tulsa.

Creek County.—Whitfield & Cobb 1 Jack, SE SE SW 27-16n-10e, topped the Dutcher sand at 2,604 ft. and with pay at 2,630-50 ft., total depth, flowed as high as 240 bbl. in 24 hours. The flow decreased during further tests but averaged 144 bbl. a day.

Garvin County.—The Texas Co. 1-B Patchell, SE SW SE 25-4n-1w, broadened the northwest trend of the Pauls Valley pool with one of its largest flowing wells yet completed. It made a 1-hour flow of 205 bbl. through 1-in. choke on tubing set at 3,970 ft., top of the second Wilcox. Total depth was 4,040 ft., still in the sand.

Osage County.—Northern Ordnance, Inc., purchased the new Bartlesville sand discovery of W. A. Davidson & Sons. The well has not been completed but was reported to be flowing at the rate of 40-50 bbl. a day after a shot in the sand at 1,506-24 ft. The well is the 1 Osage in SW SE SW 6-20n-12e.

OKLAHOMA COMPLETIONS

Wildcats

Beckham County: Northern Ordnance 1 T.D. 6,513 ft., anhydrite, 3,570 ft., dolomite 4,040 ft., Cisco 4,309 ft.

Carter County: Northern Ordnance 1 Fish, N½ NW NE 10-1s-2w, dry, T.D. 1,032 ft., Arbuckle 602 ft.

Creek County: Whitefield and Cobb 1 Jack, SE SE SW 27-16n-10e, flowed 144 bbl., Dutcher sand 2,604 ft., pay sand 2,630-50 ft.

Lincoln County: Link Oil 1 Langley, NW NE SE 11-16n-6e, dry, T.D. 1,680 ft., lost hole.

Muskogee County: F. R. Jackson 1 Blackstone, NW SW NW 30-12n-20e, dry, T.D. 1,447 ft., Arbuckle 1,390 ft.

Noble County: Ohio Oil 1 Zimmerman, NE SE NW 19-23n-2w, dry, T.D. 4,555 ft., Layton 3,576 ft., dolomite 4,458 ft., Wilcox 4,480 ft., second Wilcox 4,542 ft.

Pittsburg County: Phillips 1 Parsons, NW NW SE 24-8n-16e, dry T.D. 6,297 ft., Dutcher sand 5,555 ft., Cromwell sand 5,959 ft.

Fields

Brooksville, Pottawatomie County: Cities Service 3 Cade, SW NE NW 3-8n-3e, dry, T.D. 5,143 ft., Hunton 4,733 ft.

Byars, McClain County: Patsy Oil & Gas 8 Caldwell, S½ SE NE 16-5n-3e, flowed 196 bbl. in 24 hr., ⅝-in. choke, Viola 3,541-3,625 ft.

C. W. Roodhouse 2 Strawn, NW NE 21-5n-3e, dry, T.D. 3,636 ft., Viola 3,540 ft.

Cement, Caddo County: Magnolia 5 Cement-Henley, NE SW SE 35-5n-10w, flowed 331 bbl. in 8 hr., 1,500,000 cu. ft. gas, pay 5,465-5,505 ft., T.D. 5,525 ft., Medrano 5,390 ft.

Elgin, Comanche County: Texas 2 Roll, NW SW 5-3n-10w, dry, T.D. 1,069 ft.

Texas 2 Spencer, SE NW 8-3n-10w, 1,000-000 cu. ft. gas, 565-955 ft., T.D. 1,234 ft.

Hardy, Osage County: A. G. Oliphant No. 2, NE NE SE 3-25n-3e, swabbed 15 bbl., sand 2,606-20 ft., T.D. 2,630 ft.

Le Flore County: Western Oklahoma Gas Co. 1 Choate, NW NE NW 6-8n-24e, dry, T.D. 5,525 ft., Cromwell 5,360 ft.

Otoe City, Noble County: Superior Oil 1 Dent, NE NE NW 21-22n-1e, flowed 262 bbl. in 24 hr., ½-in. choke, Layton 3,388-3,400 ft., gravity 41.

Payne County, NW offset to 230-bbl. discovery: Amerada-Stanolind 1 Hesser, NE SW 28-20n-4e, dry, T.D. 4,053 ft. in Misener sand, P.B. 1,072 ft. for water disposal.

Stroud, E. Creek County: Sun Oil 1 Lowe, SW SE 10-14n-7e, dry, T.D. 3,327 ft., Bartlesville sand 3,217 ft.

Velma, Stephens County: Skelly 20-A Stiefel, NW NE NW 35-1s-5w, pumped 4 bbl., T.D. 748 ft.

SOUTHWEST TEXAS

Second Producer at Imogene Makes Good Well

CORPUS CHRISTI, Tex.—Heightened importance attaches to the Imogene field, Atascosa County, with the bringing in of Humble Oil & Refining Co. 1 Coward, about 1½ miles southwest of the discovery well. The 1 Coward is credited with an initial production of 291 bbl. of oil daily through ½-in. choke, with tubing pressure of 775 lb. Total depth is 7,646 ft., with 5½-in. casing set at 7,626 ft. The Edwards lime was topped at 7,536 ft. and the Dobie at 7,628 ft. Humble's 1 M. L. Thompson, which opened the Imogene pool last November with daily production of 38 bbl. on the pump, stirred small interest. Pay is in the Edwards at 7,570-73 ft.

Magnolia Petroleum Co. 6 J. C. Baldwin, in B.S.&F. Survey 165, Nueces County, is reported to have opened a new producing horizon in the Baldwin field, with potential test showing 92 bbl. of 22.2 gravity oil in 24 hours through 9/64-in. choke, with tubing pressure of 740 lb. and a packer on the casing. Total depth is 3,246 ft. and casing perforated at 3,216-18 ft.

Refugio County.—P. R. Rutherford et al 1 Huff, a mile northwest of the Fagan field, has been completed as a gas well, with initial daily production of 30,000,000 cu. ft. This new gas field has been named Inari.

Starr County.—Sun's 1-B Montalva heirs, a mile southwest of the North Sun field, flowed 55 bbl. of salt water and 8 bbl. of oil daily through 5/32-in. tubing choke. Tubing pressure varied from 0 to 200 lb., and shut-in casing pressure from 450 to 900 lb. The well, at plugged-back depth of 5,950 ft., was continuing tests.

Live Oak County.—Henderson Coquat 1 Goebel, 2½ miles northeast of Oakville, was at 7,095 ft. in sand, and an oil show was reported. Fidelity Oil & Royalty Co. 3 Reeves Brown, 3 miles east of the Lucas field, was at total depth of 4,180 ft. in sand and running an electric survey.

LOWER GULF COAST COMPLETIONS

Wildcats

Bee County: Hewitt & Dougherty 1 N. Cantu, 3 mi. SW of Papalote, dry at 6,221 ft.

De Witt County: Humble 1 R. F. and C. A. Werland, 2 mi. W of Brushy Creek field, dry at 8,949 ft.

Goliad County: Continental 1 Mrs. A. S. Wood, C.E.P.I.R.R. & Mfg. Co. Sur., 249 bbl. through ⅞-in. choke, T.P. 1,075 lb., C.P. 1,425 lb., perf. 7,600-20 ft., T.D. 8,003 ft. Discovery, opening Wilcox production. Named Slick (Wilcox) field.

Jim Wells County: Kilgore Developers and Butcher-Arthur 1 W. W. West et al, 1 mi. SE of Sandia, dry at 5,737 ft.

Karnes County: J. W. Mayo et al 1 J. W. and F. B. Moczygemba, 2 mi. SW of Falls City, dry at 6,336 ft.

San Patricio County: Coastal Refineries, Inc., et al 1 A. M. Johnson, 7 mi. N of Elroy, dry at 6,260 ft.

Fields

Agua Dulce, Nueces County: Hiawatha Oil & Gas Co. 2 M. B. Roger, Palo Alto grant, location abandoned.

Hobson, Karnes County: Seaboard 1 F. F. Konecny, E. Seguin Sur., dry at 4,315 ft.

Midway, San Patricio County: British-American 2 Dave McAngus, S.A.&M.G. R.R. Sur., A-252, 70 bbl. through ¼-in. choke, T.P. 360 lb., C.P. 600 lb., gas-oil ratio 3,900, perf. 6,085-90 ft., T.D. 6,500 ft.

North McFaddin, Victoria County: Continental 1 W. H. Crain, J. Vairin Sur., dry at 6,250 ft.

Seeligson, Jim Wells County: Sun 9 J. W. Miller, Willis Millican Sur. 335, A-291, 123 bbl. through 7/64-in. choke, T.P. 1,200 lb., C.P. 1,300 lb., gas-oil ratio 950, perf. 5,938-43 ft., T.D. 5,960 ft.

Woodsboro, Refugio County: Southern Minerals 4 R. H. Woods et al, Anastacio Reojas Sur., 66 bbl. through 3/32-in. choke, T.P. 760 lb., C.P. 1,620 lb., gas-oil ratio 1,295, perf. 5,451-56 ft., T.D. 6,046 ft.

SOUTH TEXAS COMPLETIONS

Wildcats

La Salle County: Quintana 1 F. J. Gausemeier, 4 mi. SW of Washburn field, dry at 5,760 ft.

Quintana 2-D South Texas Syndicate, 8 mi. SE of Washburn field, dry at 6,245 ft.

Fields

Cadena, Duval County: Taylor Refining Co. 2-B Genero Garcia, dry at 6,516 ft.

East, Jim Hogg County: Sun 5-A T. T. East, Santo Domingo de Arriba grant, A-358, 36 bbl. through 9/64-in. choke, T.P. 390 lb., C.P. 800 lb., gas-oil ratio 1,120, T.D. 4,737 ft.

Lockhart, Starr County: Lockhart & Davenport 1 First National Bank of Mission, 10 mi. N of Rio Grande City, 115 bbl. through ⅞-in. choke, T.P. 100 lb., S.I. C.P. 600 lb., perf. 3,570-3,600 ft., T.D. 4,104 ft., P.B. 3,798 ft.

Loma Novio, Duval County: Rodney Delange 4 Moody, J. J. White Sur., A-1796, O.W.D.D., old T.D. 2,756 ft., dry at new T.D. 2,832 ft.

South White Creek, Live Oak County: R. P. Holland et al 1 C. L. Tullos, S. B. Turner Sur., dry at 2,485 ft.

Strake, Duval County: Stanolind 3-A Farmers Life Insurance Co., P. H. Maynard Sur. 6, A-349, 146 bbl. fluid, 8 per cent salt water, through ⅞-in. choke, T.P. 240 lb., C.P. 1,140 lb., gas-oil ratio 144, perf. 3,220-30 ft., T.D. 3,232 ft.

SOUTH CENTRAL TEXAS COMPLETIONS

Wildcats

Bell County: W. F. Collins Co. 1-A S. S. Nelson, 2½ mi. S of Temple, dry at 530 ft.

Fields

Pearsall, Frio County: Wiegand Bros. 1 T. J. Gilliam, 1¼ mi. E of Pearsall field, 20 bbl. pumping, T.D. 5,988 ft., P.B. 5,375 ft. Extension well.

Poth, Wilson County: Superior Oil Corp. 1 C. J. Groos, David Holt Sur., abandoned at 4,324 ft.

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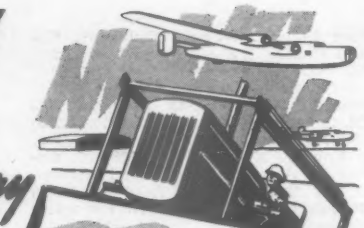

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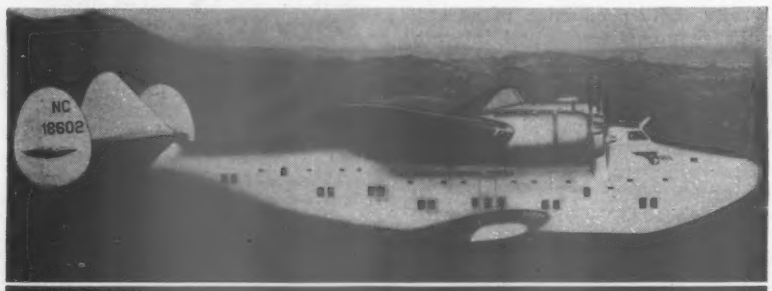

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CANADIAN FIELDS

Geological Survey Plans Ambitious Program

CHATHAM, Ont.—Extensive geological surveys to locate favorable oil structures will be carried out this season by the mines and geology branch of the federal Department of Mines and Resources at Ottawa. In the Yukon, C. S. Lord will make a geological reconnaissance of a belt 10 to 15 miles wide along the Alaska Highway between Teslin and Watson Lake, and along the Yukon-British Columbia boundary. In British Columbia, E. D. Kindle will investigate oil possibilities along the Fort Nelson River from Fort Nelson to the Liard River, and along the latter from Fort Nelson River to the Rocky Mountain front. M. Y. Williams will cover an area on the Alaska Highway from Watson Lake to Fort Nelson and C. O. Hage will continue this to Pouce Coupe.

TURNER VALLEY COMPLETIONS

North Extension: National-Vulcan 1, LSD 15, 5-21-3w5, T.D. 8,740 ft., Madison 8,565 ft., initial production around 250 bbl. daily, being held to 200 bbl., C.P. 1,300 lb., T.P. 250.

North Turner Valley: Home Oil 14, LSD 16, 33-20-3w5, T.D. 8,332 ft., Madison 7,695 ft., est. 400 bbl., waiting for allowable.

Miracle Royalties 3, LSD 13, 33-20-3w5, T.D. 8,164 ft., Madison 7,870 ft., 550 bbl. from upper porous is being held in to reduce gas-oil ratio.

Home Oil 13, LSD 9, 33-20-3w5, T.D. 7,069 ft., Madison 6,605 ft., about 800 bbl.

In Alberta, C. H. Crickmay will work east of Pouce Coupe, investigating oil structures on the southern half of the Boundary and Fairview areas and on the northern half of the Beaverlodge and Grande Prairie areas. A. H. Lang and R. A. C. Brown will work in the Entrance area northwest of Mountain Park; and C. P. Crombie and O. Erdman will examine the Alexo and Saunders areas, where drilling is now under way. G. Shaw and M. Feniak will examine oil structures in the Athabaska and Fort Assiniboine areas along the Northern Alberta Railway; and G. Shaw will do similar work in the Buffalo Park at Wainwright. Surveys in the Wapiti area will be made by J. W. Butterworth, and extensive topographical surveys will be made by J. W. Spence, R. J. Parlee, A. C. Tuttle, J. A. Macdonald and M. E. Kidd in the Entrance area.

In Saskatchewan, R. T. D. Wickenden will investigate oil structures in the Fox Valley, Kindersley and Radville areas, the first two lying east of Entrance and the Radville area south of Regina.

In eastern Canada, J. F. Caley will complete an investigation of oil and gas prospects in the Bruce Peninsula and extend the work eastward to

(Continued on Page 106)

LOUISIANA GULF

Wells in Erath Field to Be Dually Completed

NEW ORLEANS, La.—Permission to make dual completions of 11 wells in the Erath field, Vermilion Parish, has been granted Texas Co. All are to be perforated in the 8,700-ft. level. The dual completions are designed to increase production for the big recycling plant which Texas is building in the Erath field.

Possibility of a new record for depth of oil and gas production is seen as Union Producing Co. deepens hole at 1 Fitzpatrick-Vizard, in the Delarge field, Terrebonne Parish. This test has been coring in shale below 13,450 ft. The world's deepest producer, Fohs Oil Co. 1 Buckley-Bourg, in the same area, was completed at 13,266 ft. Information is not available as to whether Union's well has picked up the same sand. The drilling contract calls for a 13,500-ft. hole, and it is assumed operations will be discontinued soon. No shows were reported by Humble Oil & Refining Co. 2-B Continental Land & Fur Co., 12 miles southeast of Morgan City, in Terrebonne Parish. It was in sandy shale at 11,072 ft. and ran an electric survey at 10,650 ft.

St. Landry Parish.—J. S. Abercrombie et al 1 Alexander Charles Unit 2, in 23-7s-5e, South Leonville area, set 7-in. casing at 10,258 ft. and was preparing to start a series of production tests at about 10,100 ft.

Acadia Parish.—Sun Oil Co. and Standard Oil Co. of Ohio 1 Dailey et al, 1¼ miles southeast of Egan, was reported to have flowed 82 bbl. of 50.3-gravity distillate in 21 hours through ⅛-in. choke from perforations at 10,610-25 ft. Efforts at completion continued.

St. James Parish.—Humble 1 Colonial Sugar Co., in the Convent area, 5-12s-5e, was completed at plugged-back depth of 5,351 ft., with initial production of 91 bbl. of oil daily through 9/64-in. choke, with tubing pressure of 1,600 lb. The well drilled into salt at 7,900 ft. before plugging back.

LOUISIANA GULF COAST COMPLETIONS

Fields

Bayou Sale, St. Mary Parish: Humble 5 Dave Luke, 17-16s-9e, 312 bbl. through 9/64-in. choke, T.P. 1,800 lb., gas-oil ratio 570, perf. 10,382-96 ft., T.D. 10,496 ft., P.B. 10,401 ft.

Texas 3 State-East Cote Blanche Bay, Bay-16s-9e, 189 bbl. through 9/64-in. choke, T.P. 1,700 lb., gas-oil ratio 834, perf. 10,112-35 ft., T.D. 10,165 ft., P.B. 10,138 ft.

Delta Farms, La Fourche Parish: California Co. 10 Delta Farms, Inc., 1-17s-22e, 264 bbl. through 9/64-in. choke, T.P. 1,550 lb., gas-oil ratio 808, perf. 9,011-46 ft., T.D. 10,119 ft., P.B. 9,065 ft.

Eola, Avoyelles Parish: Amerada 1 Mrs. E. Vernon, 48-1s-2e, O.W.W.O., old T.D. 8,570 ft., new P.B. T.D. 7,490 ft., 76 bbl. in 19 hours through ¼-in. choke,

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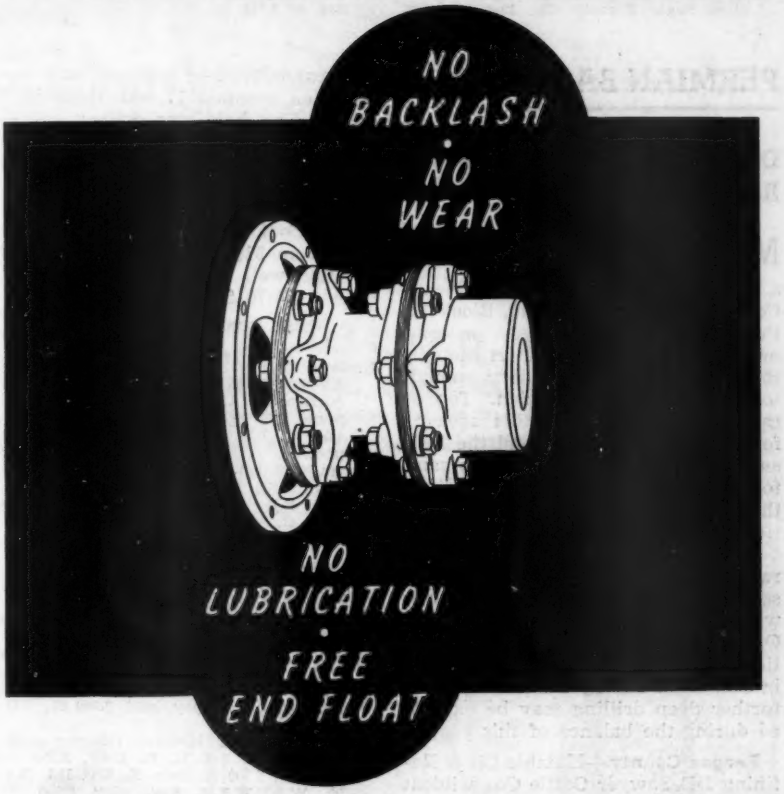

Under heavy operating loads, Thomas Flexible Couplings have given 29 years of maintenance-free service. Their design is especially suitable for Diesel engines and large motor installations where loads are subject to heavy pulsations. Thomas Couplings not only have high load carrying capacity, but they also have flexibility for angular and parallel misalignments. Thousands of installations in all parts of the world, on land and sea, give testimony to the outstanding value of this no backlash, no wear, and lubrication-free type of coupling. Write today for catalog with complete engineering data.

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FLEXIBLE COUPLINGS

THOMAS FLEXIBLE COUPLING CO.
WARREN • PENNA.

T.P. 1,375 lb., gas-oil ratio 16,784, perf. 7,480-88 ft.

Four Isle, Terrebonne Parish: Duval Texas Sulphur Co. 1 L.L.&E. Co., 23-21s-16e, dry at 1,315 ft.

Grand Bay, Plaquemines Parish: Gulf 18 State QQ, 8-20s-19e, 336 bbl. through 5/32-in. choke, T.P. 1,400 lb., gas-oil ratio 636, perf. 8,416-22 ft., T.D. 10,250 ft., P.B. 8,589 ft.

Grand Lake, Cameron Parish: Amerada 1 State-Mallard Bay, Bay-13s-4w, O.W.W.O., old T.D. 9,661 ft., new P.B. T.D. 8,395 ft., 138 bbl. fluid, 50 per cent salt water, through ⅛-in. choke, perf. 8,385-95 ft.

Jeanerette, St. Mary Parish: Atlantic 1 Adeline Sugar Factory Co., 19-13s-9e, 292 bbl. through 9/64-in. choke, T.P. 2,000 lb., gas-oil ratio 800, perf. 11,455-58 ft., T.D. 12,211 ft., P.B. 11,465 ft.

Jefferson Island, Iberia Parish: Texas 7 State-Lake Pifneur, Lake 12s-5e, 680 bbl. through 48/64-in. choke, T.P. 100 lb., gas-oil ratio 379, perf. 8,778-8,800 ft., T.D. 9,486 ft., P.B. 8,802 ft.

Pine Prairie, Evangeline Parish: C. & I. Production Co. et al 2 Sam Haas estate, 2-4s-1w, 309 bbl. through ¼-in. choke, T.P. 750 lb., C.P. 1,450 lb., gas-oil ratio 1,400, perf. 8,870-8,904 ft., T.D. 8,995 ft., P.B. 8,933 ft.

West Hackberry, Cameron Parish: Stanolind 1 J. B. Hebert estate, 33-12s-10w, dry at 9,710 ft.

PERMIAN BASIN

Deep Wildcat Staked in Reeves County

MIDLAND, Tex.—Standard Oil Co. of Texas has staked location for a 7,200-ft. wildcat test in Reeves County, SW NW Section 10, Block 72, Public School Land Survey, on land owned by T. B. Kesler. It is thought that this depth will be deep enough to penetrate the Ordovician. Top of the Delaware lime in this area is found at about 4,000 ft., and the Delaware compares with the Yates sand found in the Permian basin. Since the discovery of Ellenburger production in Winkler County, there has been considerable geophysical exploration in the Delaware basin, with several blocks of leases being taken within the last few months. Humble Oil & Refining Co. announced location for an 8,000-ft. Ordovician test in Culberson County 2 weeks ago, and further deep drilling may be expected during the balance of this year.

Reagan County.—Humble Oil & Refining 1-B Sawyer Cattle Co., wildcat in Section 15, Block 1, T.&P. Ry. Survey, topped the Ellenburger at 9,956 ft., and cored dolomite from 9,977-95 ft., recovering 10 ft. showing slight stains and no porosity. Preparations were being made to run a drill-stem test after the hole was reamed to bottom.

Winkler County.—Stanolind-Shell 1 W. D. Blue, Ellenburger discovery prospect in Section 15, Block 46, Township 1s, T.&P. Ry. Survey, was bottomed at 10,697 ft., circulating while waiting for 7-in. casing to arrive. Cores taken from near bottom of the hole showed sulfur odor, and it is possible that the test had hit water, which is to be cased off and the casing perforated. Some reports say that the casing will be run to top of Ellenburger.

Pecos County.—Magnolia Petroleum and Anderson-Prichard 1 State-Powell, Section 96, Block 10, H.&G.N. Survey, northeast of the Apco-Warner pool, flowed 50 bbl. in 24 hours, then pumped 17½ bbl. in 6 hours, cut 10 per cent with basic sediment and water, then pumped 17 bbl. fluid. in 7 hours. The hole was drilled out to 3,548 ft., and another squeeze job was being made in an attempt to shut off the water. Culbertson & Irwin 1 R. G. Heiner, outpost to the Heiner Ordovician pool, was preparing to drill plug from 5½-in. casing set at 5,182 ft. The well had a showing of oil from 5,400-70 ft.

WEST TEXAS COMPLETIONS

Wildcats

Howard County: W. S. Guthrie 1 Pauline Allen, SE SE Sec. 57, Blk. 20, Lavaca Navigation Co. Sur., elev. 2,340 ft., pump 162 bbl., 27.3 gravity, lime pay 4,040 ft., T.D. 4,096 ft. Discovery Vincent pool.

Martin County: M. J. Delaney 1 Scharbauer, SE SW Sec. 27, Blk. 39, T-1n, T.&P.R.R. Sur., elev. 2,878 ft., Yates 3,005 ft., dry, T.D. 5,202 ft.

Fields

Barnhart, Reagan County: Amerada Pet. 1-RP University, SE NE Sec. 5, Blk. 48, University Sur., elev. 2,768 ft., flow 580 bbl., 42 per cent water, pay 9,096 ft., perf. 9,096-9,228 ft., T.D. 9,380 ft.

Embar, Andrews County: Phillips Pet. 36 University, NW SW Sec. 32, Blk. 10, University Sur., elev. 3,228 ft., flow 312 bbl., Tubb lime pay, acid. 3,000 ft., T.D. 6,245 ft.

Howard-Glasscock, Howard County: Continental Oil 5-E H. R. Clay, 2,250 ft. from N, 1,700 ft. from E, Sec. 138, Blk. 29, W.&N.W.R.R. Sur., elev. 2,660 ft., pump 406 bbl., pay 2,446 ft., acid 2,000 gal., T.D. 2,515 ft.

Noelke, Crockett County: Aragon Oil 1 A. J. Wise, SW SW E½ Sec. 27, Martha Wilton Sur., temporarily abandoned, T.D. 600 ft.

Slaughter, Cochran County: Devonian Oil 31-A T. B. Duggan, 560 ft. from N, 510 ft. from W, Lab. 3, Lge. 55, Oldham County School Land Sur., elev. 3,697 ft., flow 540 bbl., lime pay 4,963 ft., acid 12,000 gal., T.D. 5,009 ft.

Slaughter, Hockley County: Magnolia Pet. 15-F Mallett, 580 ft. from S and E Lab. 7, Lge. 49, Edwards County School Land Sur., flow 1,133 ft., lime pay 4,965 ft., acid, T.D. 5,025 ft.

Taylor-Link, Pecos County: Milton Unger 1-D University, SE SE Sec. 29, Blk. 16, University Sur., elev. 2,522 ft., dry, T.D. 1,481 ft.

Tobarg, Pecos County: Stanolind Oil & Gas 9 Tobarg, 462 ft. from S, 150 ft. from E, Sec. 539, A.&B. Sur., elev. 2,297 ft., pump 17 bbl., pay 320 ft., T.D. 355 ft.

PANHANDLE

AMARILLO Tex.—Drilling activity in the Panhandle field was definitely on the upgrade as six new locations were staked in the field during the last week. Hutchinson County continues to get most of the drilling with Gray next. First dry hole reported for the field in several weeks was Stanolind Oil & Gas A-3 J. B. Bowers, in Gray County, which failed to develop production in drilling to total depth 3,172 ft. Stanolind Oil & Gas 1 Corbin, Section 275, Block B-4, Armstrong County, had drilled to 3,537 ft. in lime.

PANHANDLE COMPLETIONS

Hutchinson County: Phillips Pet. 3 Ray Ebling, 660 ft. from E, 1,980 ft. from S, Sec. 18, Blk. M-16, A.B.&M. Sur., elev. 3,340 ft., pump 164 bbl., pay 3,160 ft., acid 1,500 gal., T.D. 3,177 ft.

Gray County: Stanolind Oil & Gas A-3 J. B. Bowers, Sec. 63, Blk. B-2, dry, T.D. 3,172 ft.

Magnolia Pet. 227-62 fee, 1,984 ft. from N, 660 ft. from E, Sec. 15, Blk. 3, I.&G.N. Ry. Sur., elev. 2,912 ft., I.P. 140 bbl., 70 bbl. water, pay 2,930 ft., shot 370 qt., T.D. 3,023 ft.

Phillips Pet. 2 Clay, SE NW Sec. 177, Blk. B-2, H.&G.N. Ry. Sur., elev. 3,190 ft., pump 93 bbl., pay 3,023 ft., T.D. 3,048 ft.

Hutchinson County: J. M. Huber Corp. 28 Weatherly, 765 ft. from N and W, Sec. 25, Blk. Y, A.&B. Sur., elev. 3,142 ft., pump 52 bbl., pay 3,039 ft., T.D. 3,045 ft.

Illinois Fields

(Continued from Page 90)

3,130 ft., and still making 25 bbl. per day; P.B. to 2,985 ft. and shot at 2,957-71 ft.; swabbed 100 bbl. per day. Cleaned out and deepened to 3,140 ft. Started pumping 135 bbl. per day from Aux Vases sand and McClosky lime.

Markham City, Jefferson County: Central Pipe Line 1 J. I. Stover, C E½ NW SW 36-2s-4e, dry at 3,100 ft., upper Glen Dean 2,434 ft., lower Glen Dean 2,457 ft., Barlow 2,670 ft., Cypress 2,688 ft., Paint Creek 2,887 ft., Benoist 2,907 ft., upper Renault 2,930 ft., Aux Vases 2,935 ft., Ste. Genevieve 3,017 ft., Levias (lower O'Hara) 3,026 ft., Fredonia 3,079 ft., McClosky 3,092-99 ft.

Mount Carmel, Wabash County: Bay Petroleum 1 Hockginger A, NW NW SE 14-1s-13w, pumped 70 bbl. oil, 5 bbl. water; Waltersburg sand 1,876-87 ft., T.D. 1,888 ft.

Mount Erie, Wayne County: N. V. Duncan 1 Frank Bean, NE NE NE 3-1s-8e, old T.D. 3,186 ft., P.B. to 3,020 ft. and shot at 3,000-12 ft., tested 1 bailer of oil, 4 of water in 1 hr., dry.

North Boos, Jasper County: H. L. Hunt et al 1 J. O. McClure, C S½ SW NE 17-6n-10e, pumped 81 bbl., McClosky lime 2,819-23 ft., T.D. 2,858 ft.

North Calvin, White County: N. V. Duncan 2 H. L. Hon, SW NE NW 6-4s-14w, dry at 3,100 ft., upper Glen Dean 2,447 ft., lower Glen Dean 2,457 ft., Golconda 2,540 ft., Barlow 2,664 ft., Cypress 2,753 ft., Paint Creek 2,833 ft., Benoist 2,873 ft., no Aux Vases sand, Ste. Genevieve 2,989 ft., Rosiclare 3,026 ft., Fredonia 3,045 ft., McClosky 3,066-73 ft. with small show of gas and oil.

N. V. Duncan 2 Ben Metcalf, NE SW SE 31-3s-14w, pumped 36 bbl., Aux Vases sand 2,877-96 ft., T.D.

Rural Hill, Hamilton County: Sun Oil 2 Gideon Moss, SE NE NE 12-6s-5e, dry at 3,284 ft., Barlow lime 3,005 ft., Cypress sand 3,010 ft., Weiler 3,074 ft., upper Renault 3,125 ft., Aux Vases 3,202 ft., Ste. Genevieve 3,223 ft.

Walpole, Hamilton County: Texas 1 C. Telford, SE SE SW 22-6s-6e, pumped 71 bbl. oil and 30 bbl. water, Aux Vases sand 3,090-3,101 ft., shot at 3,100-15 ft., T.D.

Woodlawn, Jefferson County: British-American 1 Chesnik, SE SW SW 26-2s-1e, pumped 40 bbl. oil, 10 bbl. water, sand 1,974-79 ft., shot, T.D. 1,979 ft.

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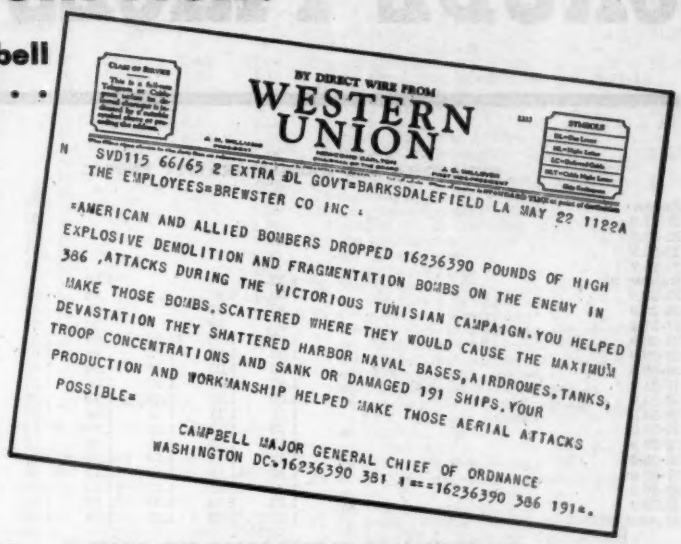

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CRUDE PRICES

OKLAHOMA AND KANSAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 21	...	...	...	...	$.85	$.75	...
21-21.9	...	...	...	...	.87	.78	...
22-22.9	...	...	...	...	.89	.81	...
23-23.9	...	...	...	...	.91	.84	...
24-24.9	...	...	...	...	.93	.87	...
Below 25	$.92	...	...	$.86	...	...	...
25-25.9	.95	$.95	...	.88	.95	.90	...
26-26.9	.97	.97	...	.90	.97	.93	...
27-27.9	.99	.99	...	.92	.99	.96	...
28-28.9	1.01	1.01	$1.01	.94	1.01	.99	...
29-29.9	1.03	1.03	1.03	.96	1.03	1.02	...
30-30.9	1.05	1.05	1.05	.98	1.05	1.05	$1.05
31-31.9	1.07	1.07	1.07	1.00	1.07	1.07	1.07
32-32.9	1.09	1.09	1.09	1.02	1.09	1.09	1.09
33-33.9	1.11	1.11	1.11	1.04	1.11	1.11	1.11
34-34.9	1.13	1.13	1.13	1.06	1.13	1.13	1.13
35-35.9	1.15	1.15	1.15	1.08	1.15	1.15	1.15
36-36.9	1.17	1.17	1.17	1.10	1.17	1.17	1.17
37-37.9	1.19	1.19	1.19	1.12	1.19	1.19	1.19
38-38.9	1.21	1.21	1.21	1.14	1.21	1.21	1.21
39-39.9	1.23	1.23	1.23	1.16	1.23	1.23	1.23
40 and above	1.25	1.25	1.25	1.18	1.25	1.25	1.25

OKLAHOMA AND KANSAS TABLE EXPLANATION

Column 1 Mid-Continent grades:
Pure Oil Co., 5-20-41.
Gulf Oil Corp., 5-20-41.
Skelly Oil Co. (Kansas only), 5-19-41.
H. F. Wilcox Oil & Gas Co., 5-20-41.

Column 2 Mid-Continent grades:
White Eagle Oil Purchasing Co., Inc., 5-19-41, Kansas only.
Sinclair Prairie Oil Marketing Co., 5-20-41.

Column 3 Mid-Continent grades:
Continental Oil Co., 5-19-41.
Phillips Petroleum Co., 5-19-41.
Tide Water Associated Oil Co., 5-20-41.

Column 4 Jackson and Tillman counties:
Gulf Oil Corp., 5-20-41.

Column 5 Mid-Continent grades:
Standard Oil Co. (Indiana), 5-20-41.
National Refining Co., 5-20-41.

Column 6 Mid-Continent grades:
Magnolia Petroleum Co., 5-21-41.
Shell Oil Co., Inc., 5-19-41.
Shell, in Carter County, 12-5-41.
Ben Franklin Refining Co., 12-4-41.
Carter Oil Co. (Oklahoma only), 5-19-41.

Column 7 Oklahoma:
Champlin Refining Co., 5-20-41.

OKLAHOMA FLAT PRICE

Cumberland	$1.14

Pure Oil Co., 9-4-41.

LOUISIANA AND SOUTHERN ARKANSAS TABLE EXPLANATION

Standard Oil Co. of Louisiana, 5-22-41.

Column 1 applies to Atlanta, Buckner, Magnolia, Schuler (Jones sand), Village, and Lewisville fields.

Column 2 applies to De Soto, Sabine, Fouke, Homer, Miller County, Sugar Creek, and Nebo.

Column 3 applies to Little Creek, Olla, and South Olla (4-3-43).

Column 4 applies to Bayou Mallet, Choctaw, Darrow, Jeanerette, Lirette, North Crowley, South Crowley, Port Barre, Potash, Roanoke, St. Martinville, and Port Allen.

Column 5 applies to University (Baton Rouge). Posted 6-2-42.

Column 6 applies to Cotton Valley crude, Rodessa and Shreveport (Cross Lake); also Anse La Butte, effective 8-1-41, starting at 80 cents for below 21°, also to Caddo effective 10-15-41.

Continental Oil Co., 5-21-41.

Column 7 applies to Abbeville, Louisiana.

Stanolind Oil & Gas Co., 5-21-41.

Column 8 applies to East and West Hackberry.

Column 9 applies to Caddo Parish, effective 10-15-41.

Column 9 applies to Evangeline, Acadia Parish.

Lion Oil Refining Co., 5-22.41.

Column 1 applies to Reynolds lime, Jones sand, Schuler, Ark.

Column 2 applies to El Dorado, West and South Rainbow fields, Snow Hill, and Schuler-Morgan sand.

Placid Oil Co., 5-22-41.

Column 2 applies to Olla.

Column 2 applies to Nebo field.

Shell Oil Co., Inc., 5-20-41.

Column 10 applies to Roanoke, Chalkley.

Column 11 applies to Iowa, Black Bayou, White Castle.

Column 12 applies to Gibson, South Houma, Hester, West Lake Verret.

Magnolia Petroleum Co., 5-21-41.

Column 13 applies to Lockport, Cameron Meadows, and West Gueydan, La.

Column 6 applies to Haynesville, Cotton Valley, Rodessa, La., and Miller County, Arkansas.

Phillips Petroleum Co., 3-29-41.

Arkansas Fuel Oil Co., 2-19-42.

Column 1, Schuler (Jones sand), except schedule starts at 76 cents for below 25° gravity.

Gulf Refining Co., 5-21-41.

Column 9, Jennings.

Column 8, Edgerly, Starks, Vinton, East Hackberry, Cameron Meadows, and Leesville.

Column 16 applies to Grand Bay, Quarantine Bay, Timbalier Bay, and West Bay, except schedule starts at $1.12 for below 28° gravity.

Column 6 applies to Caddo, Homer, Bull Bayou, Crichton, De Soto, Haynesville, and El Dorado.

Column 4 applies to West Gueydan, effective 5-25-42.

Pure Oil Co., 4-22-41.

Column 14 applies to Gueydan crude.

Column 6, Caddo, Homer, Haynesville, Bull Bayou, Crichton, De Soto, and El Dorado.

Texas Co., 5-21-41.

Column 6 applies to North Louisiana.

Columns 15 and 16, Bay St. Elaine, Caillou Island, Iberia, Lake Barre, Lake Pelto, Leesville, Port Barre. (Schedules A and B).

Column 17, Bateman Lake, Dog Lake, Fausse Point, Horseshoe Bayou, Jefferson Island, Plumb Bob, Vermilion Bay, West Cote Blanche, and Delta Duck Club.

Column 18, Delta Farm, Lake Salvador, Golden Meadow.

LOUISIANA AND ARKANSAS FLAT PRICES

Continental Oil Co.:	
Tepetate and Lake Arthur, 5-21-41	$1.18
Ville Platte, 5-22-43	1.30
Bear, 5-15-43	1.30
Gulf Refining Co., 5-21-41:	
Smackover (Ark.)	$0.83
Lion Oil Refining Co., 5-22-41:	
Smackover (heavy)	.83
Dorcheat	1.15
Phillips Petroleum Co., 5-22-41:	
Smackover (heavy)	$0.83
Placid Oil Co., 5-22-41:	
Tullos-Urania (5-21-41)	$1.15
Cotton Valley dist. (above 60°)	1.30
Cotton Valley (Holloway sand)	1.25
Cotton Valley (Bodcaw-D sands)	1.20
Pure Oil Co.:	
Bosco (5-21-41)	$1.14
Sweet Lake (5-22-41)	1.06
Creole (5-22-41)	1.16
Republic Oil Co., 6-2-41:	
Nevada County, Arkansas	$0.80
Republic Oil Refining Co., 5-21-41:	
Bayou Pigeon	$1.30
Shell Oil Co., Inc., 5-20-41:	
Happytown	$1.15
Standard Oil Co. of Louisiana, 5-22-41:	
Big Creek, Dorcheat, McKamie, Columbia, Macedonia (sour) (2-3-43)	$1.25
Smackover (heavy)	.83
Cotton Valley distillate (9-1-41)	1.40
Cotton Valley (Holloway sand)	1.25

LOUISIANA AND SOUTHERN ARKANSAS GRAVITY TABLE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Below 18	...	...	...	...	...	...	...	...	...	...	...	...	$.94	...	...	...	...	...
18-18.9	...	...	...	...	...	...	...	...	...	...	...	...	.96	...	...	...	...	...
19-19.9	...	...	...	...	...	...	...	...	...	...	...	...	.98	...	...	...	...	...
Below 20	...	...	...	...	...	...	...	$1.06	...	$.94	$.99	$.89	...	...	$1.06	...	...	...
20-20.9	...	...	...	...	...	...	...	1.08	...	.96	1.01	.91	1.00	...	1.08	...	...	...
Below 21	$.88	...	...	$.90	...	...	...	...	...	...	...	...	...	$.90	...	...	...	...
21-21.9	.70	...	...	.92	...	...	...	1.10	...	.98	1.03	.93	1.02	.92	1.10	...	...	...
22-22.9	.72	...	...	.94	...	...	...	1.12	...	1.00	1.05	.95	1.05	.94	1.12	...	...	...
23-23.9	.74	...	...	.97	...	...	...	1.14	...	1.02	1.07	.97	1.08	.96	1.14	...	...	...
24-24.9	.76	...	...	.98	...	...	...	1.16	...	1.04	1.09	.99	1.11	.98	1.16	...	...	...
Below 25	...	$.86	$1.03	...	...	$.88	...	...	...	...	...	...	...	...	...	...	...	...
25-25.9	.78	.88	1.05	1.00	...	.90	...	1.18	...	1.06	1.11	1.01	1.14	1.00	1.18	...	...	...
26-26.9	.80	.90	1.07	1.02	...	.92	...	1.20	...	1.08	1.13	1.03	1.17	1.02	1.20	...	...	...
27-27.9	.82	.92	1.09	1.04	...	.94	...	1.22	...	1.10	1.15	1.05	1.19	1.04	1.22	...	...	...
28-28.9	.84	.94	1.11	1.06	...	.96	...	1.24	...	1.12	1.17	1.07	1.21	1.06	...	$1.14	$1.06	...
29-29.9	.86	.96	1.13	1.08	...	.98	...	1.26	...	1.14	1.19	1.09	1.23	1.08	...	1.16	1.08	...
30-30.9	.88	.98	1.15	1.10	$1.28	1.00	...	1.28	...	1.16	1.21	1.11	1.25	1.10	...	1.18	1.10	$1.05
31-31.9	.90	1.00	1.17	1.12	1.30	1.02	...	1.30	$1.07	1.18	1.23	1.13	1.27	1.12	...	1.20	1.12	1.07
32-32.9	.92	1.02	1.19	1.14	1.32	1.04	...	1.32	1.09	1.20	1.25	1.15	1.29	1.14	...	1.22	1.14	1.09
33-33.9	.94	1.04	1.21	1.16	1.34	1.06	...	1.34	1.11	1.22	1.27	1.17	1.31	1.16	...	1.24	1.16	1.11
34-34.9	.96	1.06	1.23	1.18	1.36	1.08	...	1.36	1.13	1.24	1.29	1.19	1.33	1.18	...	1.26	1.18	1.13
35-35.9	.98	1.08	1.25	1.20	1.38	1.10	...	...	1.15	...	...	...	...	1.20	...	1.28	1.20	1.15
Below 36	...	...	...	...	...	...	$1.07	...	...	...	...	...	...	...	...	...	...	...
36-36.9	1.00	1.10	1.27	1.22	1.40	1.12	1.09	...	1.17	...	...	...	...	1.22	...	1.30	1.22	1.17
37-37.9	1.02	1.12	1.29	1.24	1.42	1.14	1.11	...	1.19	...	...	...	...	...	...	...	...	1.19
38-38.9	1.04	1.14	1.31	1.26	1.44	1.16	1.13	...	1.21	...	...	...	...	...	...	...	...	1.21
39-39.9	1.06	1.16	1.33	1.28	1.46	1.18	1.15	...	1.23	...	...	...	...	...	...	...	...	1.23
40 and above	1.08	1.18	1.35	1.30	1.48	1.20	1.17	...	1.25	...	...	...	...	...	...	...	...	1.25

Lisbon distillate $1.20

Texas Co., 5-21-41:
Erath $1.21
Garden Island 1.36
Lafitte, Paradis 1.19
Lake Mongoulois 1.36

CANADIAN FIELDS

Imperial Oil, Ltd.:
Petrolia, 11-6-39 ..... $2.10
Oil Springs, 11-6-39 ..... 2.07
Bothwell, 11-6-39 ..... 2.10
Turner Valley, 7-16-41 ..... $1.35-1.97

SOUTH TEXAS AND SOUTHWEST TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 20	$1.03	$1.08	$1.08	$.89	$1.03	$1.03	$1.08
20-20.9	1.05	1.10	1.10	.90	1.05	1.05	1.10
21-21.9	1.07	1.12	1.12	.91	1.07	1.07	1.12
22-22.9	1.09	1.14	1.14	.92	1.09	1.09	1.14
23-23.9	1.11	1.16	1.16	.93	1.11	1.11	1.16
24-24.9	1.13	1.18	1.18	.94	1.13	1.13	1.18
25-25.9	1.15	1.20	1.20	.95	1.15	1.15	1.20
26-26.9	1.17	1.22	1.22	.96	1.17	1.17	1.22
27-27.9	1.19	1.24	1.24	.97	....	1.19	1.24
28-28.9	1.21	1.26	1.26	.98	....	1.21	1.26
29-29.9	1.23	1.28	....	.99	....	....	1.28
30-30.9	1.25	1.30	....	1.00	....	....	1.30
31-31.9	1.27	1.32	....	1.01	....	....	1.32
32-32.9	1.29	1.34	....	1.02	....	....	1.34
33-33.9	1.31	1.36	....	1.03	....	....	1.36
34-34.9	1.33	1.38	....	1.04	....	....	1.38
35-35.9	1.35	1.40	....	1.05	....	....	1.40
36-36.9	1.37	1.42	....	1.06	....	....	....
37-37.9	1.39	1.44	....	1.07	....	....	....
38-38.9	1.41	1.46	....	1.08	....	....	....
39-39.9	1.43	1.48	....	1.09	....	....	....
40 and above	1.45	1.50	....	1.10	....	....	....

SOUTH TEXAS AND SOUTHWEST TEXAS TABLE EXPLANATION

Column 1 Mirando:
Humble Oil & Refining Co., 5-21-41, includes Blanchard, Bridwell, Colorado, Comitas, Eagle Hill, Escobas, Fitzsimmons, Glen, Government Wells (North and South), Heyser, Hoffman, Kelsey, Kohler, Loma Novia, Lundell, Manila, Mirando Valley, Placedo, Randado, Sarnosa, and Tesoro.
Magnolia Petroleum Co., 5-21-41.
Continental Oil Co., 7-1-41, includes Hoffman, Government Wells (North and South), Lopez, Moco, Colmena, Seven Sisters, South Seven Sisters, Loma Novia, Conoco, Driscoll, O'Hern, Piedra Lumbre, and Taranchauas.
American Mineral Spirits Co., 5-21-41, includes Adami and Munson.
Republic Oil Refining Co., 5-21-41, includes Heyser field crude.

Column 2 Refugio:
Continental Oil Co., 7-1-41, includes Minnie Bock, Clara Driscoll, South Clara Driscoll, Driscoll Ranch, Orange Grove and Wade City.
Humble Oil & Refining Co., 5-21-41, includes East White Point, Greta, Melon Creek, O'Connor-McFaddin, Plymouth Saxet, Taft, and Tom O'Connor.
American Mineral Spirits Co., 5-21-41, includes Plymouth, Taft, and East White Point.

Column 3 Refugio:
Texas Co., 5-21-41, includes Greta, Saxet, and Taft.

Column 4 La Rosa:
American Mineral Spirits Co., 3-29-41.

Column 5 Duval-Mirando:
Sun Oil Co., 5-21-41.

Column 6 Duval-Mirando:
Texas Co., 5-21-41.

Column 7 Nueces County:
American Mineral Spirits Co., 5-21-41.
Republic Oil Refining Co., 5-21-41.

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7	8
Below 20	....	....	....	....	$0.80	....	....	....
20-20.9	....	....	....	....	.82	....	....	....
Below 21	....	....	....	....	....	$0.85	....	....
21-21.9	....	....	....	....	.84	.87	....	....
22-22.9	....	....	....	....	.86	.89	....	....
23-23.9	....	....	....	....	.88	.91	....	....
24-24.9	....	....	....	....	.90	.93	....	....
Below 25	....	....	$0.88	....	....	....	$0.89	$0.95
25-25.9	$0.95	....	.90	$0.97	.92	.95	.91	.97
26-26.9	.97	....	.92	.99	....	.97	.93	.99
27-27.9	.99	....	.94	1.01	....	.99	.95	1.01
28-28.9	1.01	$1.01	.96	1.03	....	1.01	.97	1.03
29-29.9	1.03	1.03	.98	1.05	....	1.03	.99	1.05
30-30.9	1.05	1.05	1.00	1.07	....	1.05	1.01	1.07
31-31.9	1.07	1.07	1.02	1.09	....	1.07	1.03	1.09
32-32.9	1.09	1.09	1.04	1.11	....	1.09	1.05	1.11
33-33.9	1.11	1.11	1.06	1.13	....	1.11	1.07	1.13
34-34.9	1.13	1.13	1.08	1.15	....	1.13	1.09	1.15
35-35.9	1.15	1.15	1.10	1.17	....	1.15	1.11	1.17
36-36.9	1.17	1.17	1.12	1.19	....	1.17	1.13	1.19
37-37.9	1.19	1.19	1.14	1.21	....	1.19	1.15	1.21
38-38.9	1.21	1.21	1.16	1.23	....	1.21	1.17	1.23
39-39.9	1.23	1.23	1.18	1.25	....	1.23	1.19	1.25
40 and above	1.25	1.25	1.20	1.27	....	1.25	1.21	1.27

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS TABLE EXPLANATION

Column 1 West Central and North:
Humble Oil & Refining Co., 5-22-43, includes Brown, Callahan, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, and Throckmorton counties.
Panhandle Refining Co., 5-22-43, in Leuders area.
Gulf Refining Co., 5-22-43.
Sinclair Prairie Oil Marketing Co., 5-22-43.

Column 2 North Texas:
Continental Oil Co., 5-22-43.
Magnolia Petroleum Co., 5-22-43.
Panhandle Refining Co., 5-22-43.
Bell Oil & Gas Co., 5-22-43.
Texas Co., 5-22-43.

Column 3 East Central:
Magnolia Petroleum Co., 5-21-41, includes Cass, Panola, and Rodessa (Texas and Louisiana), and Miller County, Arkansas.
Gulf Refining Co., 5-21-41, includes Rodessa, Texas.

Column 4 East Central:
Humble Oil & Refining Co., 5-21-41, includes Anderson, Cherokee, Limestone, and Navarro counties and the Navarro Crossing field.

Column 5 East Central:
Humble Oil & Refining Co., 5-21-41, includes Hawkins field.

Column 6 North Texas:
Stanolind Oil Purchasing Co., 5-22-43.

Column 7 Fisher County:
Shell Oil Co., Inc., 12-11-41.

Column 8 Mexia:
Sinclair Prairie Oil Marketing Co., 5-30-41.

TEXAS FLAT-PRICE FIELDS

Agua Dulce (light), Benavides, Longhorn, Southland, and Sweden, 5-21-41 ..... $1.35
Agua Dulce (heavy), 10-16-41 ..... $1.25
Republic Oil Refining Co., 5-21-41.
Alfred and Magnolia City $1.35
Continental Oil Co., 5-21-41.
Alice, Benavides (North Sweden), Ben Bolt, Clark-Muil, Sun, and Tom Graham $1.35
Humble Oil & Refining Co., 5-21-41.
Batson (new), Humble (35° and above), Fig Ridge, Hardin, Hull (25° and above), La Belle, North Dayton (25° and above), Seabreeze South China, West Orange, Willow Slough and Oyster Bayou $1.25
Sun Oil Co., 5-21-41.
Cass County $1.20
Texas Co., 5-21-41.
Cayuga, Anderson County $0.90
Pan American Production Co., 5-21-41.
Chapel Hill, Smith County:
Crude distillate $1.20
Crude oil 1.18
Chapel Hill Gas System, 11-7-41.
Clay Creek, Washington County $1.00
Sun Oil Co., 5-21-41.
Cleveland, Liberty County $1.26
Magnolia Petroleum Co., 5-21-41.
Conroe, Montgomery County $1.43
Humble Oil & Refining Co., 5-21-41.
Tide Water Associated Oil Co., 5-21-41.
Sun Oil Co., 5-21-41.
Texas Co., 5-21-41.
Cotton Lake (South) $1.35
Sun Oil Co., 5-21-41:
East Texas and Flag Lake* $1.25
*Humble Oil & Refining Co., 5-21-41.
Pan American Production Co., 5-21-41.
Tide Water Associated Oil Co., 5-21-41.
Gulf Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
Sinclair Prairie Oil Marketing, 5-21-41.
Shell Oil Co., Inc., 5-20-41.
Sun Oil Co., 5-21-41.
Texas Co., 5-21-41.
Stanolind Oil Purchasing Co.
Esperson (35° and above), South Esperson $1.30
Sun Oil Co., 5-21-41.
Flour Bluff, East Flour Bluff $1.33
Humble Oil & Refining Co., 5-21-41.
Hockley and Cochran $0.87
Texas Co., 5-21-41.
Livingston and Mercy $1.25
Shell Oil Co., Inc., 5-20-41.
Long Lake $1.23
Sinclair Prairie Oil Marketing, 5-21-41.
Luby $1.35
American Mineral Spirits Co., 5-21-41.
Luling $1.06
Magnolia Petroleum Co., 5-21-41.
Lytton Springs $1.17
Magnolia Petroleum Co., 5-21-41.
Salt Flat, North Salt Flat, Darst Creek*, Hilbig, Clark, Carroll, and Zoborski $1.41
Humble Oil & Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
*Texas Co., 5-21-41.
Rincon (North), Sun, North Sun and Garcia $1.35
Sun Oil Co., 5-21-41.
Yturria $1.45
Sun Oil Co., 3-19-42.
Talco $0.79
Humble Oil & Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
Tomball and Satsuma $1.40
Humble Oil & Refining Co., 5-21-41.
*Magnolia Petroleum Co., 5-21-41.
Stanolind Oil Purchasing Co., 4-1-41.
Van, Van Zandt County $1.06
Humble Oil & Refining Co., 5-21-41.
Pure Oil Co., 5-21-41.
Yates (regular) $0.96
Humble Oil & Refining Co., 5-21-41.
Gulf Refining Co., 5-21-41.
Shell Oil Co., Inc., 5-20-41.
Yates (shallow) $0.83
Shell Oil Co., Inc., 5-20-41.

TEXAS GULF COAST GRAVITY TABLES

	(1)	(2)	(3)	(4)	(5)
Below 20	$1.06	$1.06	....	$0.98	$0.93
20-20.9	1.08	1.08	....	1.00	.95
Below 21	....	....	$1.08	....	....
21-21.9	1.10	1.10	1.10	1.02	.97
22-22.9	1.12	1.12	1.12	1.04	.99
23-23.9	1.14	1.14	1.14	1.06	1.01
24-24.9	1.16	1.16	1.16	1.08	1.03
25-25.9	1.18	1.18	1.18	1.10	1.05
26-26.9	1.20	1.20	1.20	1.12	1.07
27-27.9	1.22	1.22	1.22	1.14	1.09
28-28.9	1.24	1.24	1.24	1.16	1.11
29-29.9	1.26	1.26	1.26	1.18	1.13
30-30.9	1.28	1.28	1.28	1.20	1.15
31-31.9	1.30	1.30	1.30	1.22	1.17
32-32.9	1.32	1.32	1.32	1.24	1.19
33-33.9	1.34	1.34	1.34	1.26	1.21
34-34.9	1.36	1.36	1.36	1.28	1.23
35-35.9	1.38	....	1.38	1.30	1.25
36-36.9	1.40	....	1.40	1.32	1.27
37-37.9	1.42	....	1.42	1.34	1.29
38-38.9	1.44	....	1.44	1.36	1.31
39-39.9	1.46	....	1.46	1.38	1.33
40 and above	1.48	....	1.48	1.40	1.35

TEXAS GULF COAST GRAVITY TABLE EXPLANATION

Column 1:
Humble Oil & Refining Co., 5-21-41, in-

cludes Amelia, Clear Lake, Goose Creek, Hastings, Magnet, Mykawa (new), Raccoon Bend, South Thompson, Sugarland, Thompson, and Webster fields.

Stanolind Oil & Gas Co., 5-21-41, includes West Beaumont, High Island, and Spindletop.

Sinclair Prairie Oil Marketing Co., 5-21-41.

Stanolind Oil Purchasing Co., 4-9-42, includes Clinton and Lake Creek.

Pure Oil Co., 4-21-41, includes Louise and Ganado.

Gulf Refining Co., 5-21-41, includes Spindletop, Sour Lake, Lovells Lake, West Beaumont, Goose Creek, South Liberty, Big Creek, Blue Ridge, Fannett, Moore, Barbers Hill, Hankamer, Thompson, Lochridge, Dyersdale, and Hull (old).

Sun Oil Co., 5-21-41, includes Barbers Hill, Batson (old), Bayou Blue, Chacahoula, Cotton Lake, Esperson (below 35° gravity), Fausse Point, Goose Creek, Greens Lake, Hackberry (east and west), Hull (below 25°), Humble (below 35°), Nome, North Dayton (below 25°), Orange, Saratoga, Sour Lake, South Liberty, and Vinton.

Column 2:

Texas Co., 5-21-41, includes Arriola, Ganado, Hamman, Hillje, Humble, Kubela, Magnet, Manvel, Markham, Mauritz, Old Ocean, Pickett Ridge, Port Neches, Sour Lake, West Columbia, and Withers.

Column 3:

Pan American Production Co., 5-21-41, includes Hastings and South Houston.

Stanolind Oil & Gas Co., 4-1-41, includes High Island, Spindletop, Hastings, and South Houston.

Column 4:

Humble Oil & Refining Co., 5-21-41, includes Anahuac, Angleton, Cedar Point, Fishers' Reef, Hull (new and old), Pierce Junction, Red Fish Reef, and Turtle Bay.

Gulf Refining Co., 5-21-41, includes Anahuac, Hull (new), Thompson (deep), Pierce Junction, and Orange.

Sun Oil Co., 5-21-41, includes Anahuac, Caplen and Turtle Bay.

Humble Oil & Refining Co., 3-29-41, includes Dickinson, Gillock, Hardin, League City, and Rowan.

Pure Oil Co., 2-23-43, at Alief field.

Column 5:

Pan American Production Co., 5-21-41, includes Gillock, except scale starts at 95 cents below 21°.

Stanolind Oil Purchasing Co., 5-21-41, includes Fairbanks, North Houston, and Roslyn.

Continental Oil Co., 7-9-41.

Phillips Petroleum Co., 7-9-41.

Column 5 Winkler and Lea:

Stanolind Oil & Gas Co., 5-21-41, includes Winkler County only.

Gulf Refining Co., 5-21-41, includes Lea County, New Mexico, only.

Column 6 Gray County:

Texas Co., 5-21-41.

H. F. Wilcox Oil & Gas Co., 7-9-41.

Column 7 Lea County:

Magnolia Petroleum Co., 5-21-41.

Column 8 Eddy County:

Continental Oil Co., 5-30-41.

Column 9:

Shell Oil Co., Inc., 5-20-41, includes Crane, Ector, Howard, Glasscock, Upton, Winkler, and Yoakum counties, Texas, and Lea County, New Mexico.

Column 10 Texas Panhandle:

Humble Oil & Refining Co., 7-9-41.

Column 11 Panhandle:

Sinclair Prairie Oil Marketing Co., 5-23-11.

WEST TEXAS, PANHANDLE, AND NEW MEXICO GRAVITY TABLES

	1	2	3	4	5	6	7	8	9	10	11
Below 20	$0.70	....	....	....	....	....	....	....	$0.70	$0.73	....
20-20.9	.72	....	....	....	....	....	....	....	.72	.75	....
21-21.9	.74	....	....	....	....	....	....	....	.74	.77	....
22-22.9	.76	....	....	....	....	....	....	....	.76	.79	....
23-23.9	.78	....	$0.78	....	....	....	....	....	.78	.81	....
24-24.9	.80	....	.80	....	....	....	....	....	.80	.83	....
Below 25	....	$0.80	....	....	....	....	$0.80	....	....	....	$0.83
25-25.9	.82	.82	.82	....	$0.82	....	.82	....	.82	.85	.85
26-26.9	.84	.84	.84	....	.84	....	.84	....	.84	.87	.87
27-27.9	.86	.86	.86	....	.86	....	.86	....	.86	.89	.89
28-28.9	.88	.88	.88	$0.91	.88	....	.88	$0.88	.88	.91	.91
29-29.9	.90	.90	.90	.93	.90	....	.90	.90	.90	.93	.93
30-30.9	.92	.92	.92	.92	.92	....	.92	.92	.92	.95	.95
31-31.9	.94	.94	.94	.97	.94	....	.94	.94	.94	.97	.97
32-32.9	.96	.96	.96	.99	.96	....	.96	.96	.96	.99	.99
33-33.9	.98	.98	.98	1.01	.98	....	.98	.98	.98	1.01	1.01
34-34.9	1.00	1.00	1.00	1.03	1.00	$1.03	1.00	1.00	1.00	1.03	1.03
35-35.9	1.02	1.02	1.02	1.05	1.02	1.05	1.02	1.02	1.02	1.05	1.05
36-36.9	1.04	1.04	1.04	1.07	1.04	1.07	1.04	1.04	1.04	1.07	1.07
37-37.9	1.06	1.06	....	1.09	1.06	1.09	....	1.06	....	1.09	1.09
38-38.9	1.08	1.08	....	1.11	1.08	1.11	....	1.08	....	1.11	1.11
39-39.9	1.10	1.10	....	1.13	1.10	1.13	....	1.10	....	1.13	1.13
40 and above	1.12	1.12	....	1.15	1.12	1.15	....	1.12	....	1.15	1.15

WEST TEXAS, PANHANDLE AND NEW MEXICO TABLE EXPLANATION

Column 1:

Humble Oil & Refining Co., 5-21-41, includes Andrews, Crane, Crockett, Ector, Gaines, Glasscock, Howard, Reagan, Upton, Winkler, and Yoakum counties, West Texas, and Lea County, New Mexico.

Gulf Refining Co., 5-21-41, includes Crane, Ector, Upton, Ward, and Winkler counties, West Texas.

Stanolind Oil Purchasing Co., 5-1-43, at Slaughter and Cedar Lake.

Column 2:

Sinclair Prairie Oil Marketing Co., 5-21-41, includes West Texas and Lea County, New Mexico. Effective 5-29-41, in Eddy County, New Mexico.

Magnolia Petroleum Co., 5-21-41, includes Upton, Howard, Glasscock, Mitchell, Winkler, Cochran, Hockley, Yoakum and Gaines counties.

Column 3:

Texas Co., 5-21-41, includes Crane and Winkler counties, Texas, and Lea County, New Mexico.

Column 4 Texas Panhandle:

Magnolia Petroleum Co., 7-9-41.

EASTERN STATES

Pennsylvania and Ohio

South Penn Oil Co.:
- National lines, 3-26-42 ..... $3.00
- Southwest Penn, 3-26-42 ..... 2.85
- Eureka lines, 3-26-42 ..... 2.59
- Corning grade, 5-27-41 ..... 1.31

Tide Water Associated Oil Co.:
- Bradford, 3-26-42 ..... $3.00
- Allegany, N. Y., 3-26-42 ..... 3.00

Pennzoil Co.:
- Group A, 3-26-42 ..... $2.93
- Group B, 3-26-42 ..... 2.92
- Group C, 3-26-42 ..... 2.91
- Group D, 3-26-42 ..... 2.90
- Group E, 3-26-42 ..... 2.88

Quaker State Oil Refining Corp.:
- In Buckeye lines, 3-26-42 ..... $2.55
- In Eureka lines, 3-26-42 ..... 2.59

Kentucky

Ashland Oil & Transportation Co., 6-19-41:
- Big Sandy River $1.38
- Kentucky River 1.43

Sohio Corp., 5-21-41:
- Birk City $1.32

West Virginia

Pure Oil Co.:
- Cabin and Kelly Creek, 3-27-42 ..... $2.59

MIDDLE WEST FLAT PRICES

Illinois and Indiana

Ohio Oil Co.:
- Illinois basin, 5-21-41 ..... $1.37
- Eastern Illinois, 5-21-41 ..... $1.22
- Western Indiana, 5-21-41 ..... 1.22

Magnolia Petroleum Co.:
- Illinois basin, 5-21-41 ..... $1.37

Carter Oil Co.:
- Illinois (Louden), 5-21-41 ..... $1.37

Sohio Corp.:
- Illinois basin, 5-21-41 ..... $1.37

Texas Co.:
- Illinois basin, 5-21-41 ..... $1.37

(Continued on Page 111)

STANDARD OIL CO. OF CALIFORNIA CRUDE-OIL PRICES EFFECTIVE APRIL 1, 1943

Gravity	Signal Hill (Long Beach)	Wilmington	Seal Beach	Huntington Beach	Inglewood	Olinda-Brea Canyon	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	Greeley, Canal, Wasco	Coles Levee	Mountain View	Elk Hills, Buena Vista Hills Midway-Sunset, Lakeview area	Coalinga	Kettleman Hills	Elwood Terrace
14-14.9	....	$0.93	....	$0.96	....	$0.95	$0.95	$0.95	$0.95	$0.97	....	....	....	....	....	$0.98	$0.98	....	....
15-15.9	....	.96	....	1.00	$1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
16-16.9	....	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
17-17.9	....	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
18-18.9	$0.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
19-19.9	.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	$0.98	.98	.98	....	....
20-20.9	.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	.98	.98	.98	....	....
21-21.9	.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	.98	.98	.98	....	....
22-22.9	.96	.98	$0.88	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	.98	.98	.98	....	....
23-23.9	1.00	1.02	.92	1.02	1.01	.98	.97	.98	1.00	.97	....	....	....	....	.98	.99	.98	....	....
24-24.9	1.03	1.06	.97	1.05	1.04	1.01	1.01	1.02	1.03	.97	$0.99	....	....	....	.98	1.03	.98	....	....
25-25.9	1.07	1.09	1.01	1.08	1.07	1.04	1.05	1.06	1.07	.98	1.02	....	....	....	.98	1.07	.98	....	....
26-26.9	1.11	1.12	1.06	1.11	1.10	1.08	1.09	1.10	1.11	1.01	1.06	....	....	....	.98	1.11	.98	....	....
27-27.9	1.15	1.15	1.10	1.14	1.14	1.11	1.13	....	1.15	1.05	1.10	$1.04	....	....	1.01	1.15	.98	....	....
28-28.9	1.18	1.18	1.15	1.17	1.17	1.14	1.17	....	....	1.08	1.13	1.08	....	....	1.04	1.19	1.00	....	....
29-29.9	1.20	1.21	1.19	1.20	1.20	....	....	....	....	1.12	1.17	1.12	....	....	1.07	1.24	1.02	....	....
30-30.9	1.23	1.24	....	1.23	1.22	....	....	....	....	1.15	1.21	1.15	$1.01	$1.09	1.10	1.28	1.04	....	f.o.b.
31-31.9	....	....	....	....	1.24	....	....	....	....	1.19	1.24	1.19	1.04	1.12	1.14	....	1.06	....	ship
32-32.9	....	....	....	....	....	....	....	....	....	1.23	1.28	1.23	1.07	1.14	1.17	....	1.09	....	....
33-33.9	....	....	....	....	....	....	....	....	....	1.27	....	1.26	1.10	1.17	....	....	1.11	....	$1.22
34-34.9	....	....	....	....	....	....	....	....	....	1.31	....	1.30	1.13	1.20	....	....	1.13	....	1.25
35-35.9	....	....	....	....	....	....	....	....	....	1.35	....	....	1.16	1.22	....	....	....	$1.23	1.28
36-36.9	....	....	....	....	....	....	....	....	....	1.39	....	....	1.19	1.25	....	....	....	1.26	....
37-37.9	....	....	....	....	....	....	....	....	....	1.43	....	....	1.22	....	....	....	....	1.29	....
38-38.9	....	....	....	....	....	....	....	....	....	1.47	....	....	1.25	....	....	....	....	....	....
39-39.9	....	....	....	....	....	....	....	....	....	1.51	....	....	....	....	....	....	....	....	....
40-40.9	....	....	....	....	....	....	....	....	....	1.53	....	....	....	....	....	....	....	....	....

Standard posts 94 cents for 12 gravity and 96 cents for 13 gravity in San Joaquin fields, effective May 25, 1943.

NORTH LOUISIANA

Two Wildcats Finished as Shallow Pumping Wells

SHREVEPORT, La.—An unusual number of completions were reported in both the North Louisiana and Arkansas fields last week. In North Louisiana, wildcats were picking up with six new tests under way. In Bossier and Caddo parishes, two wildcats were finished as shallow pumpers.

New tests started were Crow Drilling Co. 1 Durbin-Bond-Simpson in SE SE SE 17-16n-15w, 5 miles east of the Bethany gas pool of Caddo Parish. It will go to the Pettit lime. In De Soto Parish, just southeast of previous production, Frank J. Hall applied for permit to drill the 1 Bread in 9-12n-16w. Two miles east of the south end of the Converse pool, H. D. McDonald will drill the 1 Long-Bell Lumber Co. in 34-9n-13w, of Sabine Parish. Hunt Oil Co. 1 Continental Land Co. will be drilled in East Carroll Parish, the exact location not being reported.

NORTH LOUISIANA COMPLETIONS

Wildcats

Bossier Parish: C. W. Beene 1 Fenet, SW NE NW 25-21n-14w, pumped 10 bbl., Nacatoch sand 1,000-02 ft., T.D.

Caddo Parish: O. R. Bolinger 1 M. G. Davis, SE SE 17-21n-14w, pumped 15 bbl., T.D. 943 ft.

Grant Parish: Sohio Producing Co. 1 International Paper, NW NW 22-8n-3w, dry, T.D. 4,726 ft., Sparta 1,202 ft., Cane River 1,645 ft., Wilcox 1,900 ft., Midway 4,610 ft.

Natchitoches Parish: Bayou Pierre Oil Co. 1 Cunningham, SW SW SW 47-10n-8w, dry, T.D. 2,450 ft.

Fields

Caddo, Caddo Parish: Conway Oil 1 Muslow, NE NW NW 4-20n-15w, flowed 100 bbl. through open 2-in., T.D. 1,500 ft.

Hosston, Caddo Parish: Bayou State Oil 1-A Owens, SE NE SE 21-22n-15w, pumped 15 bbl., T.D. 1,045 ft.

Vivian, Caddo Parish: W. T. Bell 1 Stalcup, SE NE NE 34-22n-16w, dry, T.D. 2,522 ft.

ARKANSAS COMPLETIONS

Wildcat, Ouachita County: S. J. Carnes et al 1 Rath & Cartier, NW SE 35-13s-18w, dry, T.D. 4,210 ft., Saratoga 1,617 ft., Tokio 2,247 ft., Travis Peak 2,373 ft., Cotton Valley 2,990 ft., Buckner 3,864 ft., Smackover 4,027 ft., porosity 4,045 ft.

Garland City, Miller County: Magnolia and Gulf 9 Olivet, dry, T.D. 7,906 ft., Travis Peak 5,020 ft., Smackover 7,787 ft.

Mount Holley, Union County: Lion Oil Ref. 1 Davis, NE SE 10-17s-18w, flowed 6 bbl. an hour through choke, Smackover 7,148-50 ft., T.D. 7,216 ft.

New London, Union County: Kerlyn Oil 1 Union Sawmill, SE SW 7-18s-11w, dry, T.D. 6,027 ft., Buckner 6,015 ft.

Marine Oil 7 Frost, SE SE 12-18s-12w, pumped 40 bl., perf. 5,672-88 ft., 5,707-13 ft., T.D. 5,860 ft.

Marine Oil 1 Eudy, NE SW 18-18s-11w, dry, T.D. 6,124 ft., Smackover 6,076 ft.

Stephens County: McAlester Fuel Co. 1 Williams, SW SE SE 2-15s-20w, flowed 160 bbl. through choke, perf. 2,495-2,510 ft., T.D. 3,358 ft.

T. W. Lee 2 Weaver, NE NE 15-15s-20w, pumped 30 bbl., perf. 2,529-39 ft., T.D. 3,400 ft.

R. H. Crow 1-A Weaver, SW SW SW 2-15s-20w, dry, T.D. 2,583 ft.

MISSISSIPPI

JACKSON, Miss.—California Co. 1 G. T. Smith, 4-7n-7e, Lincoln County, swabbed from 7,500 ft. for 9½ hours, recovering 8½ bbl. of oil per hour. Tubing was pulled, and the well began flowing through the casing at the rate of 28 bbl. of 25.5-gravity oil per day. The operator then swung 2½-in. tubing at 9,054 ft. and shut down for pumping unit. Humble Oil & Refining Co. 1-B L. N. Dantzler Lumber Co., 20-5s-8w, Jackson County, was drilling in shale at 11,216 ft. Gulf Refining Co. was preparing to cut and pull a stuck drill stem at 1,608 ft.

MISSISSIPPI COMPLETIONS

Issaquena County: Hunt Oil Co. 1 Robinson-Skinner, NW NW NW 8-13n-8w, dry, T.D. 4,010 ft.

Hunt Oil 1 C. L. Delaney, SE NW 26-13n-8w, dry, T.D. 4,000 ft.

Leake County: Freeport Sulphur Co. 1 Cecil Bell, SW NE NE 29-10n-9e, dry, T.D. 2,262 ft.

Madison County: Roeser & Pendleton 1 Boddie, NW SW 18-7n-1e, dry, T.D. 3,939 ft.

Sharkey County: Hunt Oil 1 A. P. Cameron, SE SE 6-13n-6w, dry, T.D. 4,210 ft.

ALABAMA COMPLETION

Walker County, 15 mi. NW of Jasper near county line: Superior Oil Co. 1 First National Bank of Birmingham, NW NW NE 18-12s-8w, dry, T.D. 1,856 ft.

MICHIGAN

No Oil Wells and Only One Gasser Completed in Week

SAGINAW, Mich.—Michigan oilfield developments were a complete blank last week so far as concerns new production. For the first time in years, the drilling completions report failed to show at least one new oil well. Saving the report from being a complete washout was a new gas-well completion in Winterfield Township, Clare County, which produced at 2,680,000 cu. ft. a day. Of the eight completions for the week, seven were dry holes and four of those were wildcat ventures.

Only eight drilling permits were reported by the state Conservation Department. Two each are for tests in Osceola and Newaygo counties, the others for locations in Allegan, Mason, Missaukee and Van Buren counties. The permit total for the year is 164.

MICHIGAN COMPLETIONS

Clare County, Sheridan Township: Turner Pet. Corp. 1 Harvey, C S½ SW SE 11-17n-3w, wildcat test, dry, T.D. 4,073 ft.

Winterfield Township: Taggart Bros. S-2 State-Monson et al, C NW 1-20n-6w, 2,680,000 cu. ft. gas, T.D. 1,337 ft.

Lake County, Ellsworth Township: Bolger Oil Co.-Gordon Oil Co. 1 Coveny, C N½ NE SE 31-19n-11w, wildcat, dry, T.D. 3,710 ft.

Montcalm County, Belvidere Township: Leslie T. Barber 2 Cornell communitized, NE NW SW 16-12n-7w, dry, T.D. 1,484 ft.

Osceola County, Richmond Township: Charles J. Smith 1 Johnson, C N½ NE NW 2-17n-10w, wildcat, dry, T.D. 3,789 ft.

Ottawa County, Holland Township: W. R. Borough, Inc.-R. L. Sanders 1 Van Slooten-Petroelje, NE NW NW 36-5n-15w, dry, T.D. 1,492 ft.

Roscommon County, Roscommon Township: Freeman Oil Co. D-1 State, C N½ NE NW 14-21n-3w, wildcat, dry, T.D. 1,617 ft.

OHIO, KENTUCKY

Record Well Completed in Clinton Sand

ZANESVILLE, Ohio.—A large oil well, probably the largest Clinton sand well ever drilled in Ohio, was completed by the Wittmer Oil & Gas Corp. of Pittsburgh, Pa., on the Charles M. Johnson farm 2 miles west of Zanesville. The well flowed 550 bbl. of Pennsylvania Grade oil in 24 hours through the casing head. The sand was reached at 3,474 ft. and drilling was stopped at 3,494 ft. and it will not be drilled through the sand or shot until the volume of oil decreases. The well is 4 miles from the nearest oil production and 12 miles northeast of the Clayton pool. Jay Hunt of Newark was the contractor and an interest holder in the well. The Ohio Fuel found the Clinton horizon dry in a test drilled inside the Wheeling Oriskany gas pool.

OHIO COMPLETIONS

Athens County, Carthage Township: Preston Oil 2 Mary Montel, Sec. 33, Berea, 5 bbl., T.D. 1,682 ft.

Lodi Township: Ohio Fuel 1 N. B. Greiner, Sec. 4, Berea, dry, T.D. 1,630 ft.

York Township: O'Mara et al 1 Hocking V. B. Co., Sec. 30, Berea, 876,000 cu. ft., T. D. 858 ft.

Coshocton County, Monroe Township: Upham Gas 1 Albert Phillip, Sec. 4, Clinton, 400,000 cu. ft., T.D. 3,541 ft.

Gallia County, Greenfield Township: Portage Producers 1 L. J. Smith, Sec. 19, Clinton, 429,000 cu. ft., T.D. 3,019 ft.

Guernsey County, Adams Township: Ronshausen 6 O. C. Ford, Sec. 21, Berea, 30,000 cu. ft., T.D. 1,082 ft.

Millwood Township: M. J. Purdy 2 R. O. Gibson, Sec. 16, Berea, 65,000 cu. ft., T.D. 1,627 ft.

Wheeling Township: Ohio Fuel 1 C. R. Kennedy, Sec. 21, Clinton, dry, T.D. 4,700 ft.

Harrison County, Monroe Township: G. Myers 6 G. W. Brown, Sec. 3, Berea, 1 bbl., T.D. 1,252 ft.

Holmes County, Monroe Township: Ohio Fuel 1 John Williams, Sec. 16, Clinton, dry, T.D. 3,308 ft.

Knox County, Jefferson Township: H. E. Perkins 1 Earl Rice, Sec. 16, Clinton, dry, T.D. 2,827 ft.

Licking County, Madison Township: Industrial Gas 1 John Monroe, Lot 27, Clinton, dry, T.D. 2,907 ft.

Lorain County, Carlisle Township: Edson 1 Cath. Rauscher, Sec. 5, Clinton, dry, T.D. 2,458 ft.

Pittsfield Township: Wiser Oil 1 Archie Waite, Lot 134, Clinton, dry, T.D. 2,275 ft.

(Continued on Page 111)

WEIGHT INDICATOR POINTS

IN FIGHTING BATTLES and drilling wells ACCURACY IS OF THE GREATEST CONSEQUENCE. With today's scarcity of steel and labor, straight holes are more important than ever before. You can't afford to take a chance on too much—or too little—weight—speed—pressure—torque, when it comes to drilling hole. The best equipment available is the cheapest. The "SEALTITE" DRILLING CONTROL provides the ultimate in accuracy and sensitivity on the toughest jobs. And because it's leak-proof, the "Sealtite" is trouble-free and *accurate*. Investigate!

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A. P. McQUISTON, BAKERSFIELD, CALIFORNIA
REED ROLLER BIT CO., HOUSTON, TEXAS

Among the Drilling Contractors

Arrow Drilling Co., Houston, Tex., has started a workover on 2 South Coast for Fifteen Oil Co., in the Charenton Beach area of St. Mary Parish, Louisiana. Stuck drill stem at 8,672 ft. has halted work on 4 South Coast, which this contractor is drilling for Fifteen Oil Co. in the same area. This hole was projected to go to 10,000 ft.

N. H. Wheless Drilling Co., Shreveport, La., has the contract for R. H. Williams 1 Marston trust, a 7,500-ft. wildcat in West Carroll Parish, Louisiana.

John E. Bish Well Servicing Co., Houston, Tex., is working over 1 Gulf fee, for D. D. Feldman; in the Evangeline field, Acadia Parish, Louisiana.

Penrod Drilling Co. has the contract to drill a 6,000 ft. wildcat which Hunt Oil Co. was starting in SW 77-22n-13e, East Carroll Parish, Louisiana.

O. W. Dyer, Jr., Houston, Tex., is rigging up at 2 Adeline Sugar Factory for Atlantic Refining Co. in 19-13s-9e, St. Mary Parish, Louisiana. The contractor has drilled to 5,000 ft. on Atlantic 1-H Rice Land & Lumber Co. in 33-3s-11w, Beauregard Parish. Projected depth is 11,800 ft.

Milhoan Drilling Co., Tulsa, has two rigs busy on the Devonian et al lease on the Duggan ranch of southeast Cochran County, Texas. Last completion last week was good for over 1,300 bbl., with depth averaging 5,000 ft. in that area.

Harry L. Edwards Drilling Co., Houston, Tex., is moving in to drill 5 Chamrad, in the North La Ward field,

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3, 5, 8, 12 and 20-ton capacities. 9" high (20-ton, 10" high). All lift over 6" *plus* extension of telescoping screw (no extension screw on 20-ton).

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Big Chief Drilling Co. crew on important rotary test in North Central Texas. The men are H. C. Colbert, driller; Paul Sublett; Ed Brasher, and O. M. Francis

Jackson County, Texas, for Cities Service Oil Co., using the rig with which this contractor recently completed 4 Chamrad. In the same field Edwards has finished 1 Brandes for Stewart & Edwards.

Davidson Drilling Co. has reached contract depth of 7,500 ft. at Skelly Oil Co. 1-K University, wildcat in Andrews County, Texas, east of the Emma pool. Favorable indications for production were found in the Tubb zone of the Clear Fork formation, and the test will probably be plugged back and an attempt made to complete as a producer in that horizon.

McQueen & Clevenger, Fort Worth, Tex., finished a 7,950-ft. dry hole for Humble Oil & Refining Co. on the Tannehill Brothers ranch of southwest Yoakum County, Texas.

Mac Drilling Co., Houston, Tex., is rigging up for Stanolind Oil & Gas Co. 3 Parker, in the Fred field, Tyler County, Texas, to go to 9,000 ft. This contractor is drilling 2 Cinco ranch for Stanolind in the Clodine field, Fort Bend County, and is testing at Houston Oil Co. 1 Cinco ranch in that field, below 3,500 ft.

Wright Drilling Co., Houston, Tex., is rigging up for 1 Anna Skarda, in the F. Perez Survey, North McFaddin field, Victoria County, Texas, to be drilled for its own account.

Delaney Drilling Co., Dallas, has contract to drill a Travis Peak test for H. S. Moss, in the Pittsburg pool of Camp County, Texas. Contract depth is 8,000 ft., but the well may be carried to the Smackover if structural conditions are favorable.

Gilger Drilling Co., Houston, Tex., will drill for Grubb & Hawkins a Tuscaloosa sand wildcat test 15 miles southeast of Greenville, in Washington County, Mississsippi. Contract depth is 6,500 ft. Gilger was at 5,400 ft. and setting pipe at 1 Edgewood Land Logging Co. in the De Quincey area of Calcasieu Parish, Louisiana, for E. R. Brann.

Parker Drilling Co., drilling 1 House, SE NW 2-1n-3w, for Amerada Petroleum Corp., a deep wildcat north of Robertson pool of Garvin County, Oklahoma, was drilling below 10,986 ft. late last week. Open hole has been carried from the surface pipe at 735 ft.

Crow Drilling Co. has contract for a Pettit wildcat test which has been spudded and surface casing set in the Spring Ridge area of Caddo Parish, Louisiana. The test is being drilled by Durbin Bond, of Little Rock, Ark., and is the 1 Simpson, in SE 17-16n-15w. It is on a block taken by Bond and Helmerich & Payne, Inc.

Oven Drilling Co. has contract on C. C. Peppers 1 Gingrich, in C NE NW 6-5n-9w, in the Cement field of Caddo County, Oklahoma, which will be a search for deeper pay zones in the older portion of the field.

Grubb & Hawkins, Houston, Tex., have the contract to drill a test on which Fort Worth and Houston, Tex., operators are cooperating in northwestern Mississippi. Roeser & Pendleton, Inc., and W. A. Moncrief, of Fort Worth, and E. A. Showers and Tide Water Associated Oil Co., Houston, have put together a drilling block, and will drill their No. 1 well, in C SE SE 26-18-6w, Washington County.

Olson Drilling Co. has contract to 9,750 ft. on Northern Ordnance, Inc. 1 Bradshaw, in C SE SE 28-22n-17w, near Cedardale, Okla., which was drilling ahead after making a drill-stem test at 6,507 ft. in sand which showed oil stainings.

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PERSONALS

FRANK LEACH

New Post Calls For Continued Interest In Oil Production

FRANK LEACH has transferred his first allegiance from Shell Oil Co., Inc., to Hollow Drilling Co., Inc., Inman, Kans., but his chief interest continues centered on exploratory and development drilling and on production operations. Recently, he became vice president and manager of the production department for the Hollow corporation, with offices in Wichita, Kans.

Before joining the drilling company, he served more than 20 years in the exploitation branch, production department, of Shell with assignments to Kansas, Oklahoma and North Texas. His last post with Shell was as division exploitation engineer in North Texas with headquarters at Wichita Falls. Previously, he was division engineer in Kansas.

Mr. Leach graduated from the University of Missouri in 1920 with a degree in engineering and subsequently finished 1 year of graduate work at the Missouri School of Mines and Metallurgy, specializing in petroleum engineering studies.

Upon completion of graduate work, he entered the services of the Shell Oil Co., Inc., in northern Oklahoma and was employed by that company continuously until joining the drilling company.

W. M. Schul, Phillips Petroleum Co., is chairman of the Seminole (Okla.) chapter of the American Petroleum Institute, which will hold its next meeting June 17. Other new officers of the chapter are **Sam Trent,** Atlantic Refining Co., first vice chairman; **G. C. McKenney,** Dowell, Inc., second vice chairman, and **H. L. Lane,** Phillips Petroleum Co., secretary-treasurer.

M. L. Williams, production foreman of Tide Water Associated Oil Co., recently completed 30 years' service with the company and was presented a gold service pin with two diamonds.

Lt. Herbert L. Boggess, Houston, Tex., who recently received his commission and who was a tester in the Shell Oil Co., Inc., refinery at Deer Park, Tex., when he enlisted in the Army Air Corps 2 years ago, is now stationed at the Big Spring, Tex., bombardier school as a pilot. He previously saw service in Puerto Rico and at Lowry Field, Colorado. A brother, **Russell A. Boggess,** employed in Shell's exploration department when he enlisted last January, is a Marine paratrooper at Camp Elliott, California.

Jack Fleming, formerly employed at the Smiths Bluff refinery, has been transferred to Pure Oil Co.'s plant at Heath, Ohio, and assigned as an assistant operating foreman.

Clark Snider, Lario Oil & Gas Co., Mount Vernon, Ill., was elected vice president of the Illinois Geological Society at a meeting of the society May 31. He fills the vacancy created by the recent transfer of **J. R. McGehee** to Tulsa.

Vorris L. Pigg has been named chief engineer of the Sohio Pipe Line Co.'s western division.

Capt. J. L. Lester, former assistant geologist for Shell Oil Co., Inc., at Centralia, Ill., recently received the winged "O" on graduation from Brooks Field Aerial Observation School.

Tom DeBow has been appointed manager of Petroleum Advisers, Inc.'s advertising and news department. This department handles the advertising of petroleum products marketed by the subsidiaries of Cities Service Co. Mr. DeBow, who has been connected with the organization for 17 years, formerly was in charge of the company's radio and public relations activities.

J. Norvelle Walker, general auditor of Royal Oil & Gas Corp., Philadelphia, Pa., has been elected treasurer of the Philadelphia chapter of the Controllers Institute of America.

Dr. K. R. Edlund, research director in charge of the chemical laboratory at Shell Oil Co., Inc.'s Wood River, Ill., refinery since 1940, has been made head of marketing research for Shell Development Co., at Emeryville, Calif. Dr. Edlund has been with Shell since 1927 when he was employed as a chemist at the Martinez, Calif., refinery after receiving his Ph.D. from University of California. In 1928 he went to Shell Development Co. and in February 1937 became chief research chemist at Wood River.

John Irwin, president of Canadian Oil Cos., Ltd., of Petrolia, Ont., has been elected president of Abasand Oils, which has been reorganized under Canadian Government sponsorship to test the possibilities of the McMurray tar sands. **E. A. Smith,** formerly plant superintendent of the Petrolia refinery, will be associated with Mr. Irwin as vice president and managing director. **Max W. Ball,** who organized Abasand Oils, will continue with the company as consultant.

Robert N. Sears, assistant district director of the Refining Division of PAW for District 4, with headquarters at Denver, has gone to Dallas, Tex., to attend a conference on manpower problems in the Refining Division which will be led by George Dewey, of the Refining Division at Washington.

Clarence O. Brown, of Rochester, Minn., managing director of the Vermilion Refinery Co., Vermilion Consolidated Oils and Franco Oils, was in Vermilion, Alta., recently, in connection with the opening of the company's reconstructed conditioning plant.

H. L. Farrar, president, Coast Counties Gas & Electric Co., San Francisco, Calif., has been named to the board of trustees of the Institute of Gas Technology at Illinois Institute of Technology.

G. P. MacDONALD

George P. MacDonald, on leave as vice president and secretary of the Richfield Oil Co. of New York, has been appointed manager of the PAW District 1 subcommittee on supplies and distribution, succeeding **L. T. Kittinger,** who has resigned and returned to the Shell Oil Co., Inc. Mr. MacDonald was formerly assistant to Mr. Kittinger. **Willard W. Wright,** formerly operations manager in District 1, has taken the post of assistant general manager.

Shifts: **Louis O. Storm,** engineer, Shell Oil Co., Inc., Wink to Albany, Tex.; **H. G. Picklesimer,** geologist, Arkansas Fuel Oil Co., Shreveport, La., to San Antonio, Tex.; **Willard M. Dow,** engineer, East Ohio Gas Co., Chicago, Ill., to Edgewater, Colo.; **R. B. Geizentanner,** engineer, Oklahoma Pipe Line Co., Cincinnati, Ohio, to Tulsa; **G. H. Gaul,** geologist, Sinclair Prairie Oil Co., Casper to Lander, Wyo.; **William Jackson,** engineer, Phillips Petroleum Co., Bartlesville, Okla., to Borger, Tex.; **Paul Witherspoon,** engineer, Phillips Petroleum Co., Bartlesville, Okla., to Borger, Tex.; **W. V. Phillips,** engineer, Lewis Production Co., Fairfax to Tulsa.

J. T. Simon, formerly district petroleum engineer for the Ohio Oil Co., at Henderson, Tex., has been transferred to Rock Springs, Wyo., and assigned to similar duties with the Mountain Fuel Supply Co., an operating subsidiary.

R. B. Curran, assistant to the president of Carter Oil Co., Tulsa, has resigned as chairman of the Kansas-Oklahoma nomenclature committee, and has been succeeded by **William R. Thawley,** chief scout of Gulf Oil Corp.

W. A. Paddock, Houston, Tex., pioneer operator in the Humble and Spindletop oil fields of Texas and still holding important oil interests, has been elected chairman of the Harris County branch of the American Red Cross for the twenty-fifth consecutive year.

Carl Illig, Jr., of the Humble Oil & Refining Co.'s legal staff at Houston, Tex., has gone to Washington to perform certain special services for the legal department of PAW. His specialty has been legal work in connection with production of toluene, synthetic rubber and aviation gasoline.

Dr. A. M. Hanson, of Los Angeles, a principal in the Mid-Montana Oil Co., which has spudded in a deep test on the Harlo dome in Wheatland County, Montana, stopped over on a return trip from Washington to be present at the spudding of the well.

Victor Von Bohm, Herman Layer, Bert Brunwin, V. C. Carter and **R. A. Bailey** have organized the V & C Oil Co. and incorporated under the laws of California preparatory to undertaking oil development.

A. R. Thompson, Mattoon, Ill., independent producer and a director of I.P.A.A., the Independent Oil Producers Association of Centralia, Ill., and of the Illinois-Indiana Petroleum Association, Robinson, Ill., has arrived in North Africa where he will serve as field director for the American Red Cross. From April 1942, until departing for North Africa, he was Red Cross field director at Camp McCoy, Wisconsin.

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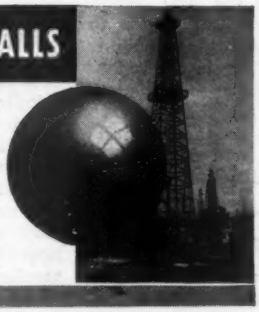

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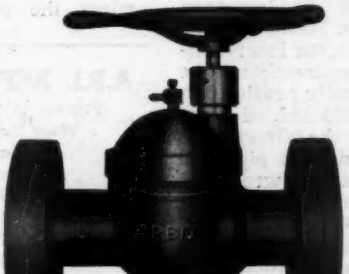

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Market Developments

East Coast

NEW YORK.—Evidences of a slight improvement in the critical East Coast gasoline situation were seen late last week end, it was indicated, the 26 "war worker" stations established under Army-Navy jurisdiction to assure supplies for employes of war plants would be discontinued. Nine such stations had been set up in New York and 17 in Baltimore early last week.

The improvement in the gasoline supply situation was attributed to the drastic measures undertaken earlier including the complete ban on pleasure driving, the 40 per cent reduction in commercial vehicle operation and the paring of B and C coupon values from 3 to 2½ gal. In order to insure available supplies reaching essential consumers, the ODT established a priority system for the northeastern states. The announcement of the ODT action stated that the 40 per cent mileage cut probably will be continued for the rest of the year in the shortage area.

Damage to the big-inch pipe line has resulted in the loss of approximately 1,250,000 bbl. of oil to the East Coast in the past 2 weeks. In the week ended May 29 shipments averaged 890,897 bbl., 6,121 bbl. higher than in the previous week but still approximately 90,000 bbl. less than the prebreak average. Because of the remarkable repair job, the loss resulting from the break apparently will be much less than generally predicted.

Plans to truck 8,000 bbl. of gasoline per day from the Greensboro terminal of the Plantation pipe line were put into effect last week and tended to relieve the severe shortage in the Baltimore-Washington area. Black market operations contributed to the tightness of the situation there as elsewhere. Newark, N. J., police seized stamps having an aggregate value of more than 2,000,000 gal. in one raid.

Pacific Coast

LOS ANGELES, Calif.—The consistent monthly decline in California gasoline sales that has occurred since Pearl Harbor started tapering off a few months ago and the latest gasoline tax sales reveal the fact that April 1942 sales were only 15.3 per cent under those of April last year. There has been a progressive improvement in the decline which was 40 per cent in December 1934, 34 per cent in January 1943, 26 per cent in February and 22.6 per cent in March. This is good news to California marketers and apparently indicates greatly increased movement of commercial vehicles and more general driving on the part of the general consuming public. There is still some question, however, whether future driving will be possible in view of a reduced production of crude oil to conserve natural gas and increased deliveries of intermediate fractions to butadiene plants. Some marketers view the future with reserve as they feel there will be little gasoline for the general public when military demand reaches the peak, reflecting military activity in the Far East.

Mid-Continent

LIMITED available supplies of crude oil this week prevented some Mid-Continent refiners from increasing their rates of operations to the June quotas authorized by the Petroleum Administration for War. Much of the higher rate of crude runs to stills approved by PAW was dependent on withdrawal of crude from storage. Companies with crude in storage are unwilling to sell their reserve supplies under the existing conditions, preferring to hold inventories against the possibility of a more critical shortage before many weeks elapse.

Partial relief of the tight crude-oil conditions prevailing in the Mid-Continent was in prospect within the next 6 to 8 months. WPB approval of the Stanolind Pipe Line Co.'s West Texas to Drumright, Okla., project will bring approximately 54,000 bbl. of new oil daily into the Middle West refinery district when the line is completed.

Meanwhile, refiners combed the crude market for supplementary supplies, mostly without success. Where possible, and in instances where the step had not been previously taken, refiners lifted their motor-fuel production west of the Mississippi River to the full allowable of 90 per cent of normal yields. Manufacturing commitments made in several cases during the second quarter, however, forced refiners to maintain their gasoline output at the previous level of 80 per cent of normal, in order to meet shipping instructions on fuel oil.

Demand for motor fuel was particularly brisk this week. Most of the Middle West flood zones returned to normal.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)

Week Ended May 29, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Residual	Gas oil
Appalachian	159	2,409	476	662
Ind., Ill., Ky.	702	10,851	3,040	4,196
Okla., Kan., Mo.	318	6,373	1,536	1,744
Censored area*	1,730	33,235	11,636	13,348
Rockies	85	1,922	600	321
California	685	21,147	50,394	11,801
Total 5-29-43	3,679	83,937	67,682	32,274
Total 5-22-43	3,698	85,331	67,717	32,193
Total 5-30-42	3,521	95,283	79,690	30,391

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
May 29, 1943	245,752,000
May 22, 1943	243,660,000
May 30, 1942	255,023,000

*Excludes unrefinable California stocks.

Gulf Coast

HOUSTON, Tex.—Gulf Coast refiners were looking forward this week to improved conditions which it is hoped will follow changes in the gasoline supply and distribution system ordered by Petroleum Administrator Ickes. David G. Gray, executive secretary of the District 3 general committee, said similar programs adopted by Districts 1 and 2 had yielded favorable results and that like benefits could be looked for in the six states comprising District 3.

Refiners and marketers were making no attempt this week to conceal their concern over the increasing scarcity of critical oil products, particularly gasoline. Sixty-five per cent of storage capacity is commonly regarded as affording reasonably adequate working stocks. Actual inventories in this territory are reported to be far below that level. Major and independent refiners seem to be unified in their misgivings over conditions that are developing as a result of inability to turn out critical war products in sufficient volume to meet probable demand. At the beginning of the year Gulf Coast refiners were told that if their runs to stills continued at the rate then prevalent they soon would be adding 90,000 bbl. of products to storage daily. They did not reduce their runs, but stocks, instead of rising, have dwindled steadily.

Not a Gulf Coast refiner was able this week to supply the gasoline for which buyers were pleading. With scarcely any qualification the same statement could be made concerning the other oil products.

Refinery Prices

(Prices as of June 8)

Quotations are f.o.b plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.125-6.500	6.000-6.125	5.500-6.000	5.000-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Résidual Bunker C‡
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200. §Gravity range.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	§1.10-1.15
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3 †36-40 gravity fuel. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—*		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		37.50
10 pour point		36.50
15 pour point		35.50
25 pour point		30.00
200 vis. at 70° F., 3 color:		
Zero pour point		39.50
10 pour point		38.50
15 pour point		37.50
25 pour point		32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND
(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.90	5.50	10.20
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.30
Hartford, Conn.	15.60	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.95
Pittsburgh, Pa.	16.70	5.50	12.30
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.30
Average 14 cities	16.02	5.14	10.85

(All prices undivided dealer basis.)

CENTRAL
(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.37	9.61

*Includes 1-cent state tax.

SOUTHEASTERN
(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10.49

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN
(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST
(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.80
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.80
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.56	5.96	10.87

California

(Continued from Page 85)

ability that only small production of heavy crude oil can be expected. The present interest in this field is due to the fact there are no other newly discovered fields in which they could concentrate their attention. For the past 2 years operators have been picking around the edges of older fields and will probably continue this attack until some new field is opened up.

Los Angeles County.—Shell and Union are preparing to undertake some extension work in the Rosecrans field and of the two projected wells, Shell's test appears the most important because a discovery or extension well at that point might lead to additional drilling. Union's outpost will be an attempt to develop commercial production in the O'Dea zone of Miocene age west of present production. Some engineers would like to see an aggressive prospector drill a series of wells west of the Rosecrans fault in the west side of the field as they feel there is a possibility of a parallel fold in that region.

LOS ANGELES BASIN COMPLETIONS

Huntington Beach, Orange County: D. D. Dunlap Trust, 3 H.B., 1-6s-11w, pumped 50 bbl., 18.1°, 2 per cent cut, T.D. 3,711 ft., perf. 3,650-90 ft., upper Ashton zone of Pliocene age.

J. H. Marion, 1 Blee, 35-5s-11w, pumped 80 bbl., 17.5°, 1.4 per cent cut, T.D. 4,070 ft., perf. 4,027-70 ft.

Southwest Exploration Co., 9-J State, 3-6s-11w, flowed 215 bbl., 19.9°, 2 per cent cut, 38/64-in. bean, T.D. 3,226 ft., P.B. 3,175 ft., perf. 2,445-3,175 ft., Huntington Beach zone of Pliocene age.

Standard, 43-A H.B., 3-6s-11w, pumped 45 bbl. net, 14.8°, 50 per cent cut, T.D. 3,700 ft., perf. 3,293-3,648 ft., second Bolsa zone of Pliocene age.

Wilmington, Los Angeles County: Long Beach Oil Development Co., 50-W, 10-5s-13w, flowed 465 bbl., 20.1°, 0.3 per cent cut, 24/64-in. bean, pressures 130/740 lb., T.D. 3,242 ft., perf. 2,929-3,240 ft., Ranger zone of Pliocene age.

Coastal District

Western Gulf Oil Co. has abandoned 1 M. A. Gilmour in the Oak Canyon field and in doing so established the outer limits of production in the southeastern end of the field. Gulf's current abandonment is located in close proximity to an old abandoned well drilled a number of years ago to 3,517 ft. A formation test of upper showings resulted in a recovery of fresh water but no test was necessary of lower parts of the hole as the formation was barren. Union Oil Co. has embarked on an aggressive yet conservative development program in the Santa Maria Valley field of Santa Barbara County where the company is building a casinghead plant to handle gas production of the field. Higher prices posted in conformity with the general increase in heavy crude-oil prices is responsible for the present drilling. Contracts provided that drilling operations could be retarded when the price of crude oil dropped below a certain figure. The recent increase has restored the price and drilling operations must be carried on.

COASTAL DISTRICT COMPLETIONS

Oak Canyon, Los Angeles County: Western Gulf Oil Co., 1 M. A. Gilmour, 32-5n-17w, dry in gray sand, T.D. 7,672 ft.

Ventura Avenue, Ventura County: Shell, 161 Taylor, 28-3n-23w, flowed 1,143 bbl. net, 30.9°, 5 per cent cut, 852,000 cu. ft. gas, 40/64-in. bean, pressures 1,300/1,350 lb., T.D. 8,744 ft., perf. 8,012-8,371 ft., 8,410-8,737 ft., intermediate Lloyd zone of Pliocene age.

Canadian Fields

(Continued from Page 92)

cover the Lake Simcoe area, in addition to securing drilling information on Bruce and Manitoulin Island. In New Brunswick F. W. Alcock will examine possible oil structures in the Sussex and Waterford areas.

British Columbia. Regulations covering the wartime development of oil prospects in the Peace River district of northern British Columbia have been agreed upon by the provincial government and the federal Department of Mines and Resources at Ottawa. Arrangements for development are now being considered. Last year extensive geological surveys of the area were carried out by the dominion government.

Southern Alberta.—In southern Alberta, extensive development work is foreshadowed by the action of several major companies in increasing their holdings to 1,420,404 acres. The acreage constitutes almost a solid block extending from Lethbridge and Taber to the Montana boundary. The holdings include: McColl - Frontenac Oil Co., associated with the Texas Co., 589,919 acres; Dominion Oil Co. and Island Pacific Oil Co., associated with Standard of British Columbia, 531,680 and 219,000 acres respectively; and Northwest Co., representing Imperial Oil, 79,805 acres.

Saskatchewan. — In southern Saskatchewan, Norcanols-Ogema 1, LSD 4, 24-7-23w2, is below 7,018 ft., deepening to the Devonian limestone after drilling through the Madison, where two oil shows were reported. Imperial-Dahinda 1, LSD 10, 28-10-23w2, is in the top of the lime below 4,794 ft. Norcanols-Parry 1 has been spotted in LSD 16, 8-9-21w2, midway between the Ogema and Dahinda wells. It is expected to get the lime high, around 3,000 ft. In the Kamsack field, eastern Saskatchewan, Oil Ventures had completed three shallow gassers, around 190 ft., No. 3 being one of the largest wells in the field, and is continuing with its 30-well program.

Ontario.—In southwestern Ontario, several interesting new tests are starting or drilling. In the new Zone Township gas area, east and south of the Dawn gas field, Union Gas 3 Zone is starting in Lot 12, Concession 3, immediately west of No. 1 discovery well. No. 2, to the east, finished dry, but prospects in other directions from the discovery have still to be tested.

In Romney Township, Kent County, George H. Rawlings is drilling a Trenton test for Erie Petroleum Co. on the Frank Dawson farm, Lot 194, North Talbot Road. Location is 2 miles west of the Shanks well which some years ago got oil near the bottom of the Trenton limestone, producing 5,000 to 6,000 bbl. before it pinched out. The Erie Petroleum test is below 400 ft. and expected to go to 3,600 ft.

Rocky Mountain Area

(Continued from Page 88)

1-D Tribal, CWL SW NW 15-3n-1w, ¾ mile north of the discovery in the Tensleep, and an outpost at Pilot Butte, which was reported a completion last week, swabbing 399 bbl. in 20 hours from the Tensleep, showed signs of improvement upon further testing. When agitated, it began flowing, and made 107 bbl. per day through the casing. Pumping equipment is being installed.

Big Muddy - Kevin - Sunburst lease switch.—The Continental Oil Co. has sold its producing properties in the Kevin-Sunburst field in Montana to the Texas Co., and the latter has disposed of its producing properties in the Big Muddy field in Wyoming to the Continental company. The exchange is effective as of June 1. Continental has a refinery adjacent to Big Muddy, and the Texas Co. has a refinery in the Kevin-Sunburst area, and the switch has mutual advantages. Texas Co. recently bought the Ohio Oil Co. properties in the northern Montana field and is now the largest single operator.

West Central Texas

(Continued from Page 84)

est. 10 bbl. 3,250-60 ft., exhausted, dry, T.D. 3,260 ft.

Bluff Creek, Shackelford County: Grace T. Knight 4 G. R. Davis, SE SE NW Sec. 219, E.T.R.R. Sur., pump 108 bbl., pay 1,587 ft., shot 30 qt., T.D. 1,603 ft.

Roeser & Pendleton and Humble 54 J. P. Morris, NW NW SE Sec. 205, E.T.R.R. Sur., pump 41 bbl., pay 1,584 ft., T.D. 1,598 ft.

Comanche County: O. L. Johnson 1 Eanes, 330 ft. from N and W 96-ac. tract, Sec. 7, John Marshall Sur., dry, T.D. 610 ft.

Nail, Shackelford County: R. H. Roark 5 J. H. Nail, C S½ SE Sec. 135, E.T.R.R. Sur., I.P. 11 bbl., pay 1,524 ft., P.B. to 1,541 ft. from T.D. 1,589 ft.

Palo Pinto County: Palo Pinto Oil & Gas 1 Martin, 330 ft. from N and W S½ Blk. 66, Lge. 3, Burleson County School Land, I.P. 3,500,000 cu. ft. gas, pay 3,319 ft., T.D. 3,321 ft.

View, Taylor County: A. R. Forster and S. B. Roberts 1 H. A. Ricks, 330 ft. from N and W, 40-ac. tract, Blk. 22, Lge. 120, Guadalupe County School Land, dry, T.D. 2,735 ft.

Wimberly, Jones County: North American Oil, Consol. 3 W. P. Mashburn, 330 ft. from N and W, E½ S½ Blk. 86, Lge. 126, De Witt County School Land, flow 672 bbl., lower Hope pay 2,295 ft., T.D. 2,300 ft.

Equipment Progress

GE Announces New Line Of Tri-Clad Motors

A new line of totally enclosed motors, the most recent addition to the widely known group of Tri-Clad motors, has been announced by the Motor Division of General Electric Co. Available in both the polyphase, 60-cycle, induction type and the single-phase, 60-cycle, capacitor type, the new motors are especially designed for use under conditions where abrasives, chemicals, rain, snow, and excessive dirt are encountered.

The polyphase motors are furnished in frame sizes 203 to 225. They include ½, ¾, and 1 hp. at 900 r.p.m.; ¾, 1, and 1½ hp. at 1,200 r.p.m.; 1, 1½, and 2 hp. at 1,800 r.p.m.; and 1½ and 2 hp. at 3,600 r.p.m. The single-phase motors are furnished in frame sizes 203 and 204, and include ¾ hp. at 1,200 r.p.m.; 1 and 1½ hp. at 1,800 r.p.m.; and 1½ and 2 hp. at 3,600 r.p.m. The mounting dimensions of these motors are interchangeable with Tri-Clad open motors of the same rating.

These new motors have all the important basic features of the Tri-Clad group. This includes triple protection —protection against physical damage, electrical breakdown, and against normal operating wear and tear.

In addition, all parts of the motor enclosures — frame, end shields, and conduit boxes—are cast iron, thus offering exceptional resistance to rust, corrosion, accidental blows, and rough use. Also, the leads are permanently encased in compound in a cast-in pocket in the stator frame, thus preventing liquids from seeping into the motor. Still further protection is provided in the form of a rotating labyrinth seal, which prevents dirt, oil, or water from entering the bearing housing. The motors are wound with Formex wire.

Laughlin Gets "E" Award

Thomas Laughlin Co., Portland, Me., in appropriate ceremonies on April 26 received the joint Army-Navy production award for outstanding production (often ahead of schedule) of wire rope and chain fittings vitally needed for the ships of the Navy and Merchant Marine.

The award was made by Rear Admiral Wat T. Cluverius, U.S.N., retired, and accepted by Donald S. Laughlin, president.

BUFFALO FIRM AWARDED ARMY-NAVY "E"

Lt. Comdr. Russell J. Roberts; Engineer Rear Adm. H. A. Sheridan, R. N., of the British Admiralty Technical Mission; Lt. Comdr. Hugh E. Wear; Capt. John S. Phillips; Comdr. E. H. Thiele; Addison F. Vars, president, Sterling Engine Co.; Lt. Comdr. G. T. Applegate; Capt. G. W. Cairnes, and Lt. Comdr. W. J. Daley, at ceremony

Sterling Engine Co., Buffalo, N. Y., held a colorful ceremony on the occasion of its being awarded the Army-Navy "E" on April 29. Several distinguished guests were present. Presentation of the award was made by Capt. John Spinning Phillips, U.S.N., to Addison F. Vars, president of Sterling. Lt. Col. J. A. McDonnell honored Sterling employes by presenting the "E" pins in token to Constance Clovin, longest service record among women; to Chester Long, longest service record among men, and to James Grobe, president of Local 55, U.A.W.-C.I.O.

New A.C. Welder Line Announced by P&H

With a view to expanding its welding equipment service to war industries, Harnischfeger Corp., Milwaukee, Wis., announces the addition of a complete line of Industrial A.C. arc welders to its present extensive line of P&H D.C. machines. Engineered and built for industrial service, these machines are being made in seven heavy-duty and four intermittent-duty models with a range of capacities for handling production welding under continuous operation. The new line features the recently adopted "WSR" (welding service range) ratings which show actual minimum to maximum output of usable welding current. Specific WSR ratings of heavy-duty models are: 50 to 270 amp., 60 to 375, 90 to 500, 100 to 625, 125 to 750, 150 to 900, and 200 to 1,200; of intermittent-duty models: 20 to 185 amp., 20 to 235, 20 to 285, and 20 to 335. Setting and control of current throughout complete welding-service range involves one simple, easy-to-operate adjustment.

M. S. A. Awarded Maritime "M"

Mine Safety Appliances Co., Pittsburgh, Pa., has been awarded its Maritime "M" Pennant and Victory Fleet Flag by the U. S. Maritime Commission, for outstanding production for the war effort.

Presenting the award was the commission's director of procurement, Charles E. Walsh, Jr. George H. Deike, M.S.A. president, accepted the award. Merit pins were awarded to all M.S.A. employes, with Charles Ziemke giving the speech of acceptance during the broadcast. Mr. Ziemke, a turret-lathe operator, is one of the company's oldest employes.

J. T. Ryan, Jr., general manager, and son of one of the company's founders, also spoke. Pittsburgh's Mayor Cornelius D. Scully gave the address of welcome.

Trade Literature

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.—Booklet on the company's Fast Coupler, a new device for joining dynamite cartridges for seismic prospecting. The booklet completely illustrates by photographs the use of the coupler.

Link-Belt Co., 307 North Michigan Avenue, Chicago, Ill.—A new 180-page general catalog (No. 850) of standard equipment. Representative types and sizes of power transmission

and materials-handling equipment are included, and preference is given throughout to the more widely adaptable designs. The catalog is particularly designed for the man who orders repair parts.

American Locomotive Co., Alco Products Division, 30 Church St., New York, N. Y.—Bulletin No. 1033, which describes the Alco pipe-line filter which was designed especially to protect pumping-station equipment on finished petroleum-product pipe lines.

Manheim Manufacturing & Belting Co., Manheim, Pa.—New Veelos V-belt catalog and instruction manual. The manual shows in detail the sequence of operations to take the belt apart at any point with an ordinary screwdriver, and then shows the necessary steps to couple the belt together again without the use of any tool whatever. It shows an illustrated procedure to be used in installing the belt on the drive. The catalog also illustrates a number of typical applications, and gives complete engineering data and a sample calculation for determining the necessary size of a drive.

Aldrich Pump Co., Allentown, Pa.—A 16-page illustrated catalog showing representative pumps and hydraulic equipment for power plants, oil fields, process industries and marine use. The text is descriptive of the many types of pumps shown and lists their applications.

Mine Safety Appliance Co., Pittsburgh, Pa.—A 32-page handbook entitled "How to Make Your Safety Equipment Last Longer." The book is illustrated throughout by marginal drawings pertinent to the text, which covers every type of personal protective equipment.

Among Equipment Men

Bedell Joins Graver Tank & Mfg. Co., Inc.

Announcement has recently been made of the appointment of A. E. Bedell as chief engineer of Graver Tank & Mfg. Co., Inc., in charge of all engineering and development covering all divisions of the company. Formerly associated with Max B. Miller & Co., Inc., and for 14 years in charge of engineering for that company, Mr. Bedell has had vast experience in the construction of refinery equipment, supplemented by previous experience in the chemical, power, sugar, and general industrial fields.

Mr. Bedell's headquarters will be at the general offices of the company located at East Chicago, Ind.

Cooper-Bessemer Promotes R. S. Warren

R. S. Warren, who joined Cooper-Bessemer Corp. 8 months ago as assistant advertising manager, has been promoted to the position of sales promotion manager.

For 7 years before joining Cooper-Bessemer, Mr. Warren was in charge of advertising and sales promotion for Invincible Manufacturing Co., Dover, Ohio.

In addition to his regular duties, Mr. Warren will devote considerable time to the company's expanding war-production-drive activities as chairman of the labor-management publicity subcommittee.

Galbreath Named Vice President of Plomb Tool Co.

J. C. GALBREATH

Election of J. Charles Galbreath as vice president of Plomb Tool Co. at the recent meeting of the board of directors is announced by Dillon Stevens, chairman of the board.

The promotion of Mr. Galbreath comes as a result of many years with Plomb during which time he has been active in both the sales and the manufacturing phases of the business. Most recently he has been in charge of the contract department where his duties have included the direction of large orders for important war production concerns in all types of industries.

In assuming the responsibilities of his new office, Mr. Galbreath will also retain general supervision of Plomb's contract department.

Appointment of Berado Perez-Fraga to the export department of Plomb Tool Co. is announced by Carroll W. Harlan, export manager.

Mr. Perez-Fraga comes from Havana, Cuba. He was 13 years with Peninsular-Occidental Steamship Co., attaining the position of assistant manager. Later he became traffic representative for Pan-American Air Lines.

A. C. (Cappy) Higgins In Active Service

A. E. Higgins, vice president and sales manager for Pittsburgh Equitable Meter Co.—Merco Nordstrom Valve Co., Pittsburgh, Pa., was commissioned as major in the U. S. Air Corps on May 8. He was called immediately for active duty. A veteran of World War 1, Major Higgins has held a reserve officer's commission for many years.

Prior to associating with the Pittsburgh firm he served as secretary for the Natural Gas Department of the American Gas Association.

Major Higgins originally qualified as an Army air pilot in 1918. He has since flown his own plane throughout his business career, and enters the Air Corps with over 6,000 hours solo credit.

Johns-Manville Ceremonies Attended by 4,000

More than 4,000 Johns-Manville workers and members of their families who packed into an improvised auditorium to celebrate formal raising of the Army-Navy "E" flag over their Manville, N. J., factory on March 24, received a remarkable tribute from Maj. Gen. Thomas E. Robins.

"I am convinced," General Robins said, "that you men and women of the Johns-Manville factory have a wider and more diversified part in the war effort than any other group in the United States!"

The major general, chief of the Construction Division, O.C.E., together with other Army and Navy officers, inspected the Johns-Manville plant earlier in the day. The flag ceremony, staged at noon in one of the huge warehouse buildings that had been cleared for the occasion, was followed by a luncheon in which the entire plant personnel, wives, families and visitors were served.

The flag was accepted on behalf of the Manville factory workers by John E. Begert, plant manager. Comdr. Austin S. Kibbee, appearing for the Navy, presented the lapel insignia, badge of honor that every employe of the plant is entitled to wear. Claude Schollenberger, president of the A.F. of L. local, and Elizabeth Mozell, representing women workers, made brief addresses. Frank Ryan, assistant to the manager of the factory, presided and introduced Brig. Gen. James I. Bowers, of the New Jersey National Guard, who made the address of welcome.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED RATE

8 CENTS A WORD, minimum charge $2 per insertion.

SITUATIONS WANTED, 4 cents a word, minimum charge $1.

BOX NUMBERS, count 9 words when replies are to be sent to our Tulsa Office.

10% DISCOUNT if 3 insertions are ordered at one time, with check accompanying order.

Classified display advertising set in single or double column style:

DISPLAYED—PER INCH

Classified display advertising set in single or double column style:

1 inch	1 time	$7.00
1 inch	13 times	6.50
1 inch	26 times	6.00
1 inch	39 times	5.50
1 inch	52 times	5.00

Rates are governed by total space used within 12 months from date of first insertion. Credits are allowed when lower rates are earned.

FORMS CLOSE MONDAY NOON—PUBLISHED EACH THURSDAY

HELP WANTED

WANTED MECHANICAL ENGINEER
With experience in design of oil well drilling and servicing equipment. Excellent opportunity for a man with creative ideas, ability and good personality. The person employed to fill this position will work under the Chief Engineer and will be responsible for all work in this field. Permanent position with major company located in the Southwest. State education, experience, age, draft status and other particulars, including recent photograph in first letter. Essential worker applicant must have war manpower commission certificate of availability. Box B-640, The Oil and Gas Journal, Tulsa, Okla.

REFINERY EQUIPMENT MANUFACTURER
requires the services of man experienced in fabrication of heat exchangers and pressure vessels for supervisory position. Must know shop practices. Reply giving full details of qualifications. Box B-621, The Oil and Gas Journal, Tulsa, Okla. Applications from those now employed in war industries will not be considered.

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

HERE'S AN OPPORTUNITY

Growing research organization wants alert, reliable, man with mature judgment, tactful personality, familiarity with petroleum refining technology, ability to write in popular style, generate ideas for and supervise publicity releases and advertising layouts. Position permanent, requires residence in East. Opportunity up to individual. Reply stating age, draft status, education, experience, complete list of employers, salary expected. Enclose recent photograph or snap-shot. Samples of work would be helpful. All replies strictly confidential. Box B-651, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

PETROLEUM ANALYST
To analyze present and future markets for post war planning. Must have knowledge of oil industry including drilling and refining equipment, prospective new fields, all existing refineries and oil fields. Box B-630, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

PROCESS ENGINEER with 21 years experience in design, construction and operation of latest developments in casinghead plants and oil refineries, desires connection with refiner or manufacturer of refinery equipment. Box B-636, The Oil and Gas Journal, Tulsa, Okla.

GEOPHYSICIST: Sixteen years' experience in seismic and gravity methods, technical and administrative, major and independent, foreign and domestic. Age 43, Class 3A(H). Desire position with progressive geophysical company with opportunities to cash in on experience and for advancement. Available at once. Box B-652, The Oil and Gas Journal, Tulsa, Okla.

11 YEARS' experience, pumping, gauging, refinery and gasoline plant operation. Desire position as district gauger or cargo inspector. Gulf Coast area. Draft status 3A. New car. Box B-654, The Oil and Gas Journal, Tulsa, Okla.

SALESMAN: Wants connection with opportunity. Age 31, military exemption. Excellent character, good appearance. High school education. Experience as salesman, and oil and gas field superintendent. Good knowledge petroleum and gas industry United States and Canada. References. Write: Murray D. Rowe, 350 Bay Street, Toronto, Canada.

CABLE TOOL DRILLER: 23 years' experience, 42 years old, married, no children. Driller, toolpusher, contractor. Shut down own tools for duration to enter Army or Navy. Refused by both services for slight deafness in one ear. Pilot R.A.F. captain, in last war. Excellent physical condition. Can drill on any type machine or standard rig to any depth. Have had experience in Oklahoma, Texas, Kansas, Missouri, Wyoming, California, Indiana, Pennsylvania, New York, and the West Indies. Rotary driller in 1923-24. No rotary work since then. Will go anywhere but prefer wildcat job in Rocky Mountain district. Capable of drilling and/or running tools under any conditions. Member A.I.M.M.E. Can give many references. Now in California, can be reached through Box B-650, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

OIL STATISTICIAN
TAX ACCOUNTANT
EXECUTIVE
Now employed as Secretary-Treasurer, oil producing company. Desire change of my own volition. Familiar with Federal and States Taxes, including Income, Declared Value Excess Profit Taxes, all Governmental and State reports pertaining to oil industry. Reorganizations under Federal Chandler Act, systems and accounting procedure, Production, Pipe Lines and Refinery branches, as well as Joint Interest ventures. Public Accounting experience. Desire permanent connection with substantial concern. Age 44, draft exempt. Post Office Box No. 2991, Dallas, Texas.

REFINERY TECHNICIAN—Chemical Engineer; Experienced superintendent, Chief Chemist, consultant; Process development and supervision; all phases refinery operation including waxes, asphalts, specialties; progressive, ambitious. Executive type position desired where past eighteen years experience can be used in management, direction, supervision, consulting, and advising capacities. Box B-656, The Oil and Gas Journal, Tulsa, Okla.

MONEY RAISING

WANTED: Working capital. Have geological data indicating probable location of several Gulf Coast salt domes or structures. Additional torsion balance stations necessary to correlate data to prove or disprove existence. If you have the money to invest and would be interested in discovering new oil reserves on a participating basis, address: Christian Iden, Geophysicist, Box 1589, Willis, Texas, or 1740 Commerce Bldg., Houston, Texas.

FINANCING

CAPITAL SEEKERS—Interested in raising $35,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

LEGAL BLANK

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

INCORPORATION

DELAWARE CHARTERS: Powers broad, taxes low. Many of the largest corporations have Delaware charters. Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

LEASES AND DRILLING BLOCKS

NEW MEXICO
State Oil and Gas Leases
Forty acres and multiples thereof, in a new HoT spot, 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, N. M.

FOR SALE—Oil and Gas Leases on structure, oil production, acreage for drilling contracts, also proven tracts of fluorspar. W. P. Harley, Bowling Green, Ky.

NOTICE of Oil and Gas Lease Sale. Ute Mountain Indians will lease by bid approximately 2080 acres. Bids to be opened June 25, 1943. Information may be secured from Floyd E. MacSpadden, Superintendent, Consolidated Ute Indian Agency, Ignacio, Colo.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois.

20 Years' Experience

Inquiries Invited.

B. D. BUCKLEY
60 Broadview Drive, Clayton St. Louis, Mo.

(Continued on Next Page)

Classified Advertising

EQUIPMENT FOR SALE EQUIPMENT FOR SALE

Liquidating 3 Complete Refineries

Lynch Refining Company
Kilgore, Texas

Evansville Refining Co.
Evansville, Indiana

Titan Refining Company
Stark, Michigan

Complete stocks refining equipment, valves and fittings. Immediate delivery from our Tulsa Warehouse.

Refinery Equipment, Inc.

W. C. Berry
Union Ave. at 21st Street

Robert W. Duden
Tulsa, Oklahoma

FOR SALE: 300-13" OD, 8 thread, new casing couplings. 1—Gasoline Power Drilling Rig good for 3000'. Also Steam Drilling Rigs and pipe and casing of all sizes. We also purchase abandoned Leases, Refineries, pipe lines and other oil field equipment. If in need of material, or have material for sale, communicate with LOUISIANA IRON & SUPPLY CO., Shreveport, La., Phone 5223, or L.D. 1.

FOR SALE: Many sizes, reconditioned safety and relief valves, also pressure and temperature, recording, controlling and indicating instruments. All repairs and workmanship guaranteed. McGatlin Instrument Co. 1612 Bryan Street, Dallas, Texas.

MIMEOGRAPH, automatic feed, hand driven, $100.00; Niagara Duplicator, electric, $275.00. Both good machines. Want to sell one. Taylor, 2-3325, P.O. Box 1947, Tulsa, Okla.

FOR SALE: One Cardwell R. L. Drawworks with spudder attachment, two 6" drill collars, 4½" kelly, core barrel, traveling block, hook, swivel, steel doghouse, light plant, and all necessary tools for rotary rig including 92' steel mast, also one 76 all steel Star Spudder mounted on mud boat. Equipment at Salem. HARVEY H. SIMS DRILLING CO., Box 180, Salem, Illinois.

FOR SALE: 2000' 6⅝" OD and 2500' 5⅛" OD Casing both 13# plain end, smooth, double random lengths, one weld per joint, clean inside and out, beveled, ready to lay. Price 40c. M. J. Regan, Coffeyville, Kansas.

1—60 HP HRT Boiler
1—200 HP Water Tube Boiler
All Sizes Oil Country Boilers
25,000 Feet New 4" OD 14 Gauge
Buttweld Steel Tubing

LUCEY PRODUCTS CORPORATION
Tulsa, Oklahoma

Second hand Oklahoma City alloyed sucker rods, ¾", ⅞" and 1".
Have sold millions of feet with satisfactory results. I recommend these rods up to 4000 ft.

M. R. TRAVIS
1702 S. Boulder Tulsa, Oklahoma

HORIZONTAL TANKS

3—14,250 Gal. Cap. 9' x 30'
2—11,250 Gal. Cap. 8' x 30'
1—10,500 Gal. Cap. 10' x 17'
2—18,000 Gal. Cap. 10' x 30'
Located Illinois and Michigan

R. C. STANHOPE, Inc.
60 E. 42nd St. New York, N. Y.

FOR SALE: Complete slim hole rotary rig. Cardwell Drawworks, 7¼ x 12 Gardner Pump powered by 225 HP Waukesha Engine, 4200' of 3½" drill pipe, etc. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE at Chase, Kansas warehouse 8,000 feet 3" 9.30# 10V Thread Upset used Seamless Steel Tubing. Cities Service Oil Company, Patridge, Bartlesville, Okla.

FOR SALE: Slightly used—2-F-M 2-Cyl. Model 47—B.O. Diesel or gas engines, 1—7¼" x 14" G-D. Power Slush Pump. 3800 ft. 6⅝" Pittsburgh Special D.P. Hughes Joints. 1—Large 8" Emsco rotary rig with F-M Diesel power. Box B-646, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Two Model HL Cardwell Double Drum Spudders. One 29W Bucyrus-Erie Type "E" all Steel Spudder. One Model "ET" Franks well servicing unit, equipped with 3-sheave mast, mounted on C-55 International truck. Motor recently overhauled. One OCS Pup Truck Type well servicing unit, equipped with 2-sheave mast, mounted on C-50 International Truck. Motor completely overhauled. One 1938 9.20 White Tandem Truck, long wheel base, equipped with heavy Braden Winch, flat oil field bed, rolling tail board, gin poles, Motor recently factory reconditioned. One 1941 Ford 1½ Ton Truck, equipped with Tulsa Winch, oil field bed, gin poles. One 1940 D-35 International Truck equipped with Tulsa Winch. B. M. McGraw, Carmi, Ill.

4000' GRADE D 3½" OD 13.30# range 2 internal flush external upset drill pipe equipped with Hydril tool joints; also, 5000' full hole 4½" OD 16.60# range 2 drill pipe. Chas. B. King, Panhandle Bldg., Wichita Falls, Texas.

DIESEL—GAS—ENGINES

Large selection — All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.

Complete information on request.

A. G. SCHOONMAKER COMPANY
48 Church Street, New York, N. Y.

162—3½" OD—6½" Centers—Chrome Key Headers
30—Pieces 3½" ID—4" OD—21' to 28' Long—Chrome Tubes
120—Pieces 3" ID—3½" OD—30' Long—Chrome Tubes
1—½" Shell 5' x 74'—4000 barrel cap. Crude Oil Fractionator with Trays
30—Pumps, various sizes and types

ARROW PETROLEUM CO.
FOREST PARK, ILL.

EQUIPMENT FOR SALE

FOR SALE

2 7"x8" Model VTO Troy Steam Engines DC to 8"x4" Model HQ 84-31 Kinney Rotary Pump, with strainers $850.00 each.
1 8"x8" Model VT Engine only, $450.00
1 #1A National Std 7'x22'6" Oil Gas Separator, $800.00.
1 Bessemer Roller Single Eccentric Pumping Power, $75.00.
1 17"x2"x15" Worthington DPP Steam pump 2500# WP 26 GPM $850.00.
1 14"x3"x14" Worthington DPP Steam pump 4000# WP 50 GPM, $650.00.
2 10"x14", 2 12"x14", 1 12"x16" Brownell Horizontal Steam Single Cyl. Engines, $400.00 each.
650 Railroad ties.
1 200' Loading Rack.
2 2½" Type MULT BJ 4 Stage Centrifugal Pumps on cast iron base, $350.00 each.

Patridge, Cities Service Oil Co., Bartlesville, Okla.

3 NEW U-9 International Power Units, complete with clutch and power takeoff. Utility & Industrial Supply Co., Jackson, Michigan.

FOR SALE: 200 tons of cable tools located at Big Spring, Texas. For information write Box B-653, The Oil and Gas Journal, Tulsa, Okla.

Used Engines and Compressors
We Rebuild and Guarantee
L. F. SMITH CO.
217 W. Archer, Tulsa, Okla.

EQUIPMENT WANTED

WANTED: PUMPS, CLOSE CLEARANCE, CAST IRON LIQUID END SIMPLEX

GPM	Suction	Discharge	Size
8	300	500	6½ x 3 x 8
11	300	550	6½ x 3 x 8
14	80	550	14 x 3 x 14
12	250	360	6½ x 3 x 8
28	300	360	6 x 5 x 12
28	300	360	6 x 5 x 12

Box B-601, The Oil and Gas Journal, Tulsa, Okla.

EQUIPMENT WANTED: Magnetometer for oil prospecting. State price and condition. Box B-581, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Good used centrifugal pumps 1", 1¼", 1½" and 2". Advise price and condition. CENTRAL PIPE & SUPPLY CO., P.O. Box 1442, Lubbock, Texas.

WANTED: One 3—3½ Ton Tractor Truck with 3000 gallon insulated tank trailer for transporting asphalt. Must be in A1- condition. TALCO ASPHALT & REFINING COMPANY, Mt. Pleasant, Texas.

WANTED TO BUY

By reliable eastern marketer, operating refinery or part interest. State production particulars. Write P.O. Box 145, Hawthorne, New Jersey.

WANTED: VESSELS
1—24" x 32' x ½"-⅝" Shell
2—30" x 12'-15' x 15/16"-1" Shell
1—24" x 50' x ⅜"-½" Shell with Bubble Plates.

Box B-602, The Oil and Gas Journal, Tulsa, Okla.

AIR or gas compressor, horizontal type, 7x7 or 8x8 double acting, belt driven. Chas. B. King, Panhandle Bldg., Wichita Falls, Texas.

WANTED

Used Structural Steel
Pipe — Valves
Fittings
Send us your list

SONKEN-GALAMBA CORP.
108 N. 2nd St., Kansas City, Kansas

Classified Advertising

EQUIPMENT WANTED

WANTED: Truck load quantities, or more, of used small pipe, black and galvanized, ½", ¾", 1", 1¼" and 1½", shopped or unshopped. Advice price and location. CENTRAL PIPE & SUPPLY CO., 2611 Avenue H, Lubbock, Texas.

WANTED: Low power binocular microscope, preferably Spencer make, suitable for examination of oil well cuttings. Give full details first letter including make, model, condition, range of power, and price. Cosden Petroleum Corp. Att'n.: Mr. C. F. Barnes, Geologist, P. O. Box 1311, Big Spring, Texas.

WANTED

Used storage tanks:
Pressure Tanks:
All sizes
Send us your list.

SONKEN-GALAMBA CORP.
108 N. 2nd St., Kansas City, Kansas

WANTED

COMPLETE Plants, Pipe-Lines, and Industrial Enterprises bought for cash or liquidated for the owners. Wire, phone, or write—INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., 1044 Canal Bldg., New Orleans, La.—MA 5586.

PATENT ATTORNEYS

PATENTS, Trade-Marks, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

EXPLORATION

TORSION BALANCE geophysical surveys contracted. Very reasonable rates. Modern instruments, experienced, capable, torsion balance field personnel. Expert interpretations. Address: Christian Iden, Geophysicist, Box 1589, Willis, Texas, or 1740 Commerce Bldg., Houston, Texas.

Ohio Fields

(Continued from Page 99)

Medina County, Granger Township: Ohio Fuel 1 Neale Aikman, Lot 59, Clinton, 235,000 cu. ft., T.D. 3,532 ft.

Meigs County, Bedford Township: Ohio Fuel 1 W. J. Carleton, Sec. 32, Berea, 1,800,000 cu. ft., T.D. 1,595 ft. (drilled deeper).

Orange Township: H. B. Walker 2 Cesco Adkins, Sec. 35, Berea, 12 bbl., T.D. 1,615 ft.

Monroe County, Franklin Township: J. C. Luberg 2 George McConnell, Sec. 1, lime, 20 bbl., T.D. 1,326 ft.

Morgan County, Marion Township: C. P. Bowman 11 R. M. Talbott, Sec. 7, Cow Run, dry, T.D. 490 ft.

York Township: Industrial Gas 2 Dell Rambo, Sec. 26, Berea, dry, T.D. 1,173 ft.

Muskingum County, Blue Rock Township: Industrial Gas 3 U. S. A., Sec. 9, Clinton, 238,087 cu. ft., T.D. 4,416 ft.

Industrial Gas 2 H. S. Barricklow, Sec. 16, Clinton, 448,200 cu. ft., T.D. 4,330 ft.

Falls Township: Wittmer 1 Charles M. Johnson, third quarter, Clinton, 550 bbl., T.D. 3,494 ft.

Stark County, Bethlehem Township: Obermiller 1 P. Bille, Sec. 2, Clinton, 384,000 cu. ft., T.D. 4,527 ft.

Washington County, Barlow Township: Healey 12 D. R. Martin, Sec. 5, stray, 900,000 cu. ft., T.D. 1,298 ft. (drilled deeper).

Grandview Township: Henning Bros. 1 J. A. Williams, Sec. 34, Squaw, dry, T.D. 1,810 ft.

Wayne County, Sugar Creek Township: Crowley et al 1 Sam McClelland, Sec. 14, Berea, 387,000 cu. ft., T.D. 761 ft.

INDIANA COMPLETIONS

Jay County: Grissell & Kivis 1 Ankron, NE cor. 23-23n-13e, dry at 1,060 ft., top of Trinity lime 924 ft.

Posey County: Yingling Bros. 1 Dickhant, NW SE NE 19-6s-12w, pumped 24 bbl., Cypress sand 2,340-56 ft., T.D.

Central States 5 Hermson, SE SE NW 20-6s-12w, pumped 15 bbl., Waltersburg sand 1,880 ft., T.D. 1,916 ft.

Felix Jablonski 2 Renwick, SE SW SW 1-7s-12w, dry at 2,566 ft., Ste. Genevieve lime top 2,403 ft.

Vanderburg County: George Nelson 1 Zimmerman, SE SW SE 22-7s-11w, dry at 2,566 ft., McClosky lime 2,559 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—Seven wells are being drilled in the Cleopatra-Panther area in Daviess County, Kentucky, where Miller & Shiarella and Ashland Refining Co. recently completed a 175-bbl. well in Benoist sand at 1,833-39 ft. Nearest to completion in the area is Andrew Teller 1 R. A. Alvey, 1¼ miles southeast of the discovery well.

An interesting leasing play is being conducted on both sides of the Ohio River from Owensboro to Louisville. Leases on land within 5 miles of the river are being taken at prices ranging from 25 cents to 50 cents per acre. Carter Oil Co. and Shell Oil Co., Inc., are the leading lease buyers in this play but Ashland Oil Refining Co. and Ohio Oil Co. and a number of individual buyers are more or less active.

In the Smith Mills pool in Henderson County, Gulf Refining Co. 8 T. T. Williams, a near completion, is making 200 bbl. of oil and 8 bbl. of water a day while testing Cypress sand at 2,307-17 ft., and its 9 Williams is showing about 42 bbl. of oil and 49 bbl. of water from McClosky lime at 2,636-55 ft. and 2,699-2,718 ft.

WESTERN KENTUCKY COMPLETIONS

Daviess County: Miller & Shiarella et al 1 T. P. Miller, near Panther, southwest of Owensboro, pumped 175 bbl. per day, Benoist sand 1,833-57 ft. Pool opener.

Henderson County: Iley Browning 1 Lee Strum, pumped 135 bbl., Tar Springs sand 1,966-76 ft. Pool opener.

Carter Oil Co. 1 Ohio Valley Trust 4 miles south of Henderson, dry at 2,715 ft., Glen Dean 1,923 ft., Barlow 2,169 ft., McClosky 2,639 ft., St. Louis 2,710 ft.

Coaster Co. 1 George Kloke, N of Geneva, dry at 2,595 ft., Ste. Genevieve lime top at 2,507 ft., salt water in McClosky lime at 2,582-94 ft.

Carter Oil 1 Willett-Moore, dry at 2,633 ft.

Trans-Tex 28 C. D. Burbank, Smith Mills pool, pumped 152 bbl., Cypress pay 2,304-12 ft., shot.

Milo B. Siegel 1 Blackwell, Birk City area, pumped 63 bbl. from Palestine sand pay at 1,040-58 ft., shot.

Union County: Trans-Tex and Ashland 1 Newman, 2½ mi. W of Morganfield, pumped 247 bbl., Penn sand 1,428-40 ft., T.D. 2,755 ft.

Sun 4 W. Morgan, pumped 58 bbl. from Waltersburg sand 1,781-97 ft., T.D. 1,799 ft.

Ohio Oil 6 Briscoe, 2 mi. NE of Spring Grove, dry at 1,399 ft.

Webster County: Hassie Hunt Trust 1 Rames, 2½ mi. NW of Dixon, dry at 3,123 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—Oil and gas-well drilling hit a lighter note in eastern Kentucky this week and completions also followed the downgrade.

Only one light producing oil well was drilled in, according to reports received here. However, two new locations were made and weather conditions aided road building.

Johnson County: Dixon Oil Co. 1 Sam Cochran, on Little Paint Creek, 1 bbl.

Crude-Oil Prices

(Continued from Page 98)

Gulf Refining Co.:
Illinois basin, 5-21-41 ..... $1.37

Michigan

Simrall Corp., 5-27-41:
Greendale, Porter, Vernon, Crystal, and Wise $1.44
Buckeye, Bentley, Edenville, Beaverton, and Monitor (sweet) 1.42
Freeman, Redding, Lincoln and Winterfield 1.39
Hamilton-Grout 1.29
West Branch-Arenac 1.24
Sohio Corp., 5-1-41:
Bloomingdale-Columbia $1.45
Mid-West Refineries, Inc., 5-1-41:
Kent County $1.38
Pure Oil Co., 5-27-41:
Sherman $1.39
Midland (Midland County) 1.44

ROCKY MOUNTAIN GRAVITY TABLE

Below 29 ..... $0.96
29-29.9 ..... .98
30-30.9 ..... 1.00
31-31.9 ..... 1.02
32-32.9 ..... 1.04
33-33.9 ..... 1.06
34-34.9 ..... 1.08
35-35.9 ..... 1.10
36-36.9 ..... 1.12
37-37.9 ..... 1.14
38-38.9 ..... 1.16
39-39.9 ..... 1.18
40 and above 1.20

Stanolind Oil & Gas Co., 5-20-41, includes Dutton Creek, Midway, and Salt Creek except Tensleep crude, Wyoming.

Sinclair-Wyoming Oil Co., 5-20-41, includes Salt Creek and Lost Soldier, except Tensleep crude, Wyoming.

Continental Oil Co., 5-21-41, includes Fort Collins and Wellington, Colorado.

Wyoming

Ohio Oil Co.:
Rock River (5-20-41) $1.10
Lance Creek (7-1-41) 1.12
Elk Basin and Grass Creek (light) .. 1.00
Elk Basin (heavy) (4-28-43) ..... .90
Grass Creek (heavy) (4-1-43) ..... .85
Stanolind Oil & Gas Co.:
Frannie (light) (4-1-43) $0.85
Frannie (heavy) (4-1-43) ..... .62
Grass Creek (light) (5-20-41) 1.00
Grass Creek (heavy) (4-1-43) ..... .85
Hamilton dome (2-26-43) ..... .80
Elk basin (5-20-41) 1.00
Salt Creek (Tensleep) (4-1-43) ..... .8285
Continental Oil Co.:
Big Muddy (5-30-41) $1.08
Lance Creek (9-1-41) 1.12

Montana

Continental Oil Co., 4-1-41:
Cat Creek $1.15

Colorado

Stanolind Oil & Gas Co., 5-20-41:
Iles $1.07
Continental Oil Co., 5-21-41:
Canon City-Florence $1.05

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Journalisms:

EXPERIMENTAL work has been carried on at the Agricultural and Mechanical College of Texas for some time on the productive capacities of flow pipes on gas lift. The purpose of this work is to determine the capacity of pipe of given diameter and length when lifting liquids at various submergences or flowing pressures and at different rates. Secondly, the quantity of gas required to lift a barrel of liquid through pipe under different conditions was also studied. S. F. Shaw, associate professor at the college had prepared a discussion of the results obtained to date which will appear in next week's Engineering and Operating Section.

MEMBERS of the Journal's editorial staff have been spending considerable time lately determining the probable postwar trends in the American oil industry. There is no reason to believe that the demand curve will show much variation from the practically uninterrupted rise since 1900. The last war saw the introduction of many new practices in exploration, drilling and refining and it is to be expected that similar developments will follow this war. It is, of course, impossible to predict the results of the application of as yet untried techniques but it is possible, at this time, to predict what will be required of them. The drilling and production requirements of the postwar period will be covered in an article scheduled for an early issue of the Journal and this will be followed by discussions of the advances in drilling, production, transportation and refining techniques already under way.

METALLIZING, a method of salvaging worn metal parts, has been developed over a period of years but the scarcity of metals resulting from the war has greatly increased its importance to industry. In next week's issue, L. E. Kunkler, president, Metallizing Co. of America will describe the process in full, including the latest method for preparing surfaces for metallizing, the electric bonding method.

DEEPENING wells by the use of acid is said to be much cheaper than by the use of spudders or other drilling methods. As the formations treated are limestones, no bailing or cleanout work is required and the formation is acidized simultaneously with the deepening process. The process and equipment used is described in an article by Leo Courter, Dowell, Inc., which will appear in next week's Journal.

NEXT week the Exploration and Drilling section will include a discussion of secondary processes in reservoir rocks and the changes in permeability and porosity resulting from these changes. These chemical processes may continue after oil has entered the reservoir thereby affecting production methods.

CALENDAR

June

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, Petroleum Division, annual meeting, Los Angeles, Calif., June 17.

PENNSYLVANIA GRADE CRUDE OIL ASSOCIATION, twentieth annual meeting, Pittsburgh, Pa., June 25.

INTERSTATE OIL COMPACT COMMISSION, summer quarterly meeting, William Penn Hotel, Pittsburgh, Pa., June 25-26.

July

PETROLEUM INDUSTRY WAR COUNCIL, regular meeting, Washington, D. C., July 14.

September

AMERICAN CHEMICAL SOCIETY, petroleum division, fall meeting, September 6-10. Place of meeting not yet determined.